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*Lancet*, 1952, **1**, 655.
*ibid* 1953, **1**, 497 and 602.
*Practitioner*, 1953, **170**, 266.
*Medical Press*, 1954, **231**, 521.

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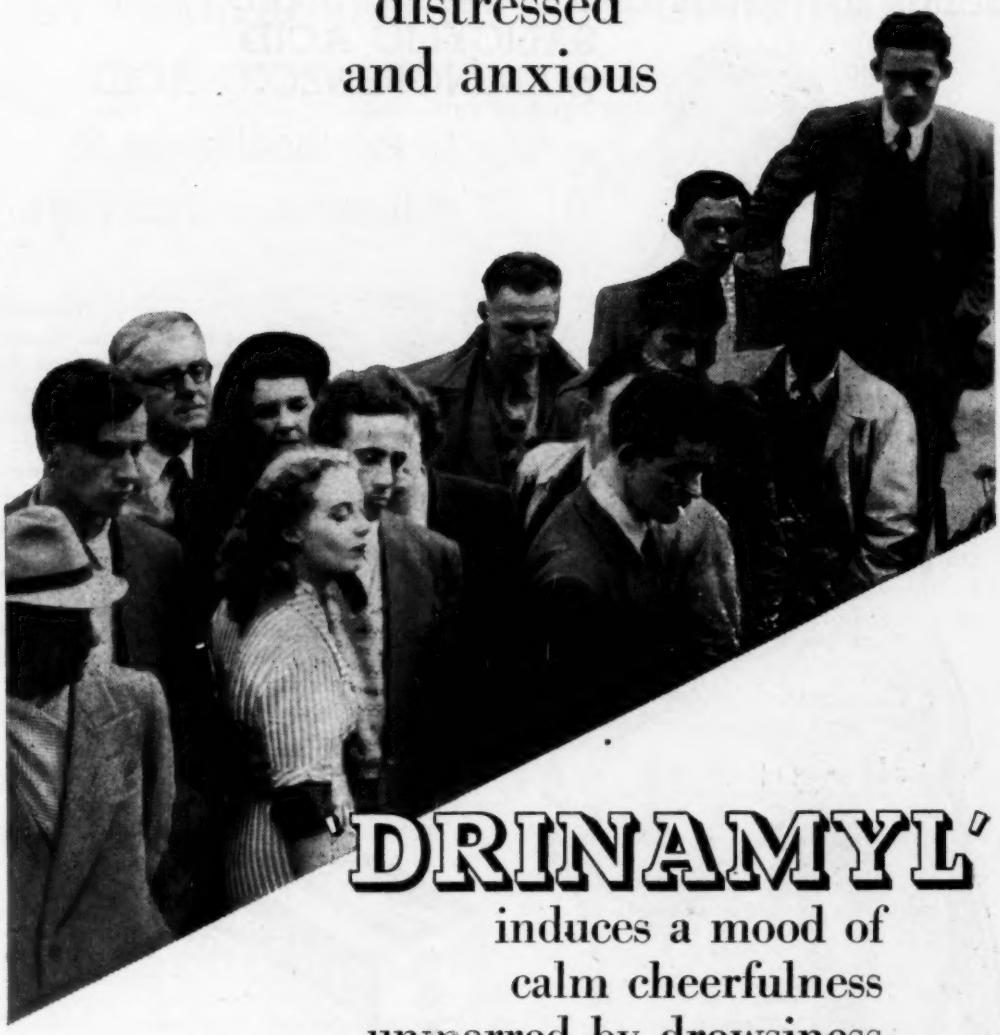

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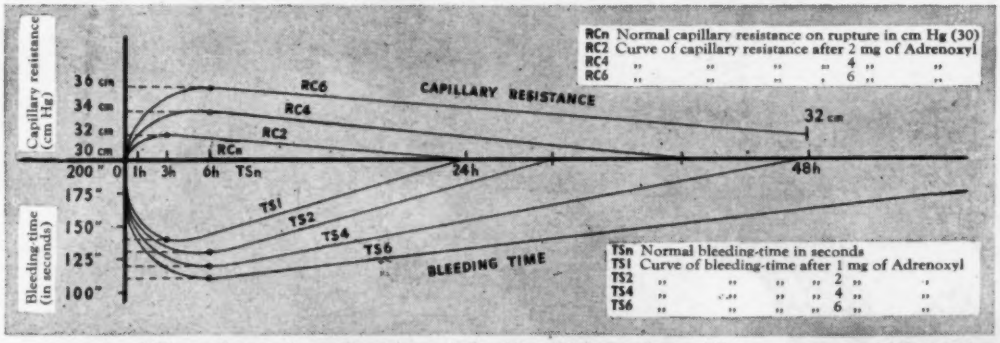


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C.R. *Soc. Biol.* 1944, **138**, 875.

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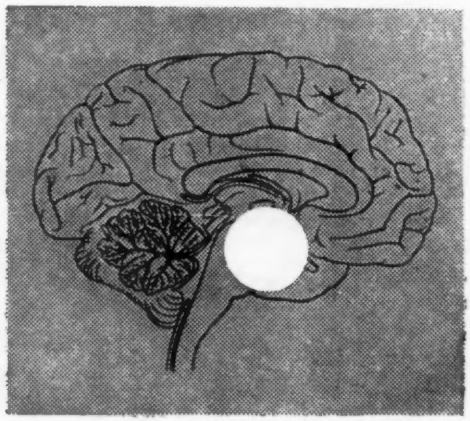

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*Solutions for injection* —
0·5 per cent in 5 c.c. ampoules
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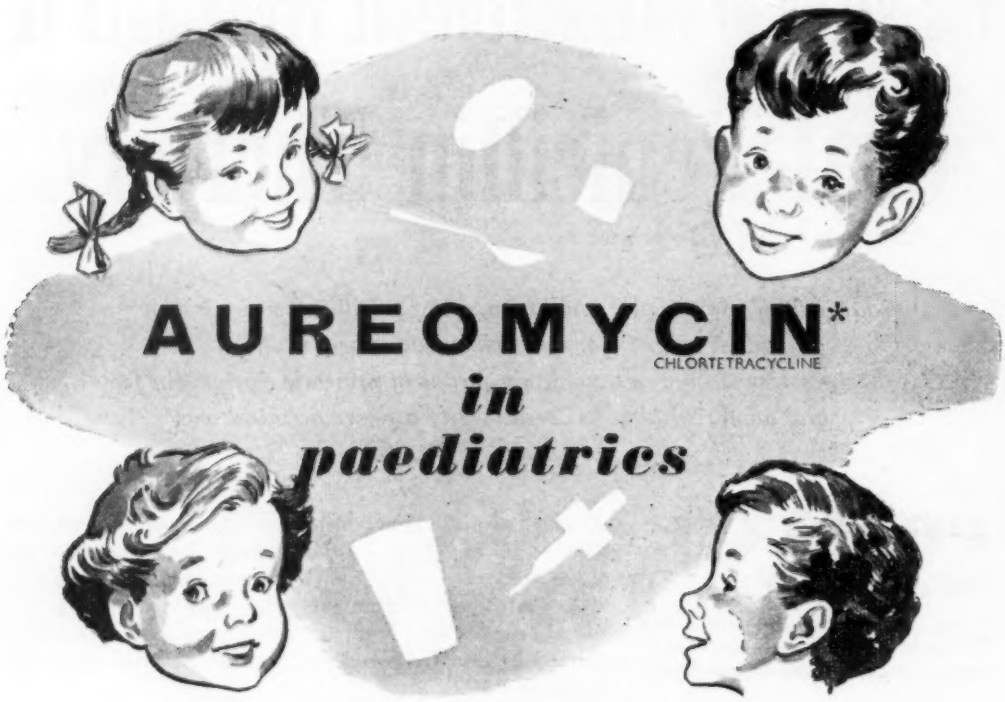

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# PREVENTION AND TREATMENT OF HYPERTENSIVE HEART-FAILURE BY GANGLION-BLOCKING AGENTS*

K. SHIRLEY SMITH
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B.A., D.M. Oxfd, M.R.C.P.
ASSISTANT PHYSICIAN

CHARING CROSS HOSPITAL, LONDON

THE most common complication of hypertension is heart-failure. That this feared and grave event is essentially the outcome of left ventricular overwork has never seriously been questioned. From this assumption has sprung the conception that every effort must be made to lower the blood-pressure in hypertensive heart-disease. In recent years the introduction of ganglion-blocking drugs has enabled physicians to reduce blood-pressure surely and significantly. Since heart-failure is the commonest cause of death in hypertension, the effect of differing degrees of blood-pressure control on this complication needs study. The pursuit of steady pressure control has tended to obscure the fact that one of the essential aims of therapy is the prevention of left ventricular failure. We aim here to show how this purpose may be achieved even if there is not a continuous significant reduction of pressure, and to record the changed pattern of cardiovascular complications and mortality among hypertensive patients treated with hexamethonium.

TABLE I—LEFT VENTRICULAR FAILURE TREATED WITH HEXAMETHONIUM

| Case no. | Treatment (mos.) | Other drugs | Improvement in effort tolerance | Comments |
|---|---|---|---|---|
| 1 | 31 | .. | + + + | .. |
| 2 | 30 | .. | + + + | .. |
| 3 | 24 | Digitalis | + | Poor control of blood-pressure |
| 4 | 18 | .. | + + + | Disappearance of gallop rhythm |
| 5 | 16 | Digitalis at first | + + + | Cure of severe cardiac asthma |
| 6 | 15 | Digitalis | + + | Without digitalis, dyspnœa before injections of hexamethonium |
| 7 | 12 | Digitalis | + + | Cure of cardiac asthma |
| 8 | 7 | .. | + + + | .. |

The practical aspects of the management of these patients have already been described (Smith et al. 1954).

### Effect of Hexamethonium on Heart-failure

In our series of 114 hypertensive patients treated with ganglion-blocking agents, mainly hexamethonium bromide, there were 26 in heart-failure, established or threatened. In every case this had set in before treatment with hexamethonium started. Congestive heart-failure was present in 6, established left ventricular failure in 14, and incipient left ventricular failure in 6. The results of hexamethonium treatment in these three groups were as follows:

(1) *Congestive Heart-failure.*—3 patients have been followed for eighteen, eighteen, and twelve months. In each instance digitalis and mersalyl were used at first. In 2 of the patients, after the disappearance of congestion, hexamethonium given alone prevented the recurrence of failure. The 3rd patient remained greatly better when treated with hexamethonium and digitalis than he was when given either alone. 3 later patients presenting with hypertensive congestive failure were treated first with hexamethonium alone. They failed to respond to this treatment and needed digitalis and mersalyl. Their follow-up has been too short to say whether hexamethonium alone will prevent the recurrence of failure.

(2) *Established Left Ventricular Failure.*—There were 14 patients with established left ventricular failure treated with hexamethonium. The results in 8 cases are summarised in table I. Although all in this group have remained out of heart-failure, 3 have died of strokes and 2 of uræmia, and another is dying in this state. Hexamethonium alone brought swift relief to most of these patients and prevented recurrence even when blood-pressure control was not maintained over the twenty-four hours. In 1 patient paroxysmal dyspnœa came on before each of the two daily injections of hexamethonium bromide and was relieved by the subsequent injection; digitalis prevented these attacks. Of the 2 other patients requiring digitalis in this group 1 had very severe heart damage, and 1 was but poorly controlled with oral hexamethonium.

TABLE II—CONTROL OF BLOOD-PRESSURE AND RELIEF OF DYSPNŒA IN 18 PATIENTS PRESENTING WITH DYSPNŒA

| Control of blood-pressure | Relief of dyspnœa | | | |
|---|---|---|---|---|
| | Good | Fair | Poor | Total |
| Good .. .. | 6 | 1 | .. | 7 |
| Fair .. .. | 3 | 2 | .. | 5 |
| Poor .. .. | 5 | 1 | .. | 6 |

(3) *Threatened Left Ventricular Failure.*—6 patients in this condition were all greatly improved by ganglion-blocking agents. They had been under treatment for an average period of eighteen months. Not only was dyspnœa notably relieved but also there was alleviation of other symptoms and signs, such as angina and gallop rhythm.

In all three groups of patients recurrence of heart-failure appeared to be prevented by hexamethonium even when the blood-pressure was poorly controlled over most of the twenty-four hours. In table II blood-pressure control is correlated with relief from dyspnœa in 18 patients complaining solely or essentially of this symptom. All had hypertensive heart-disease and had been treated with hexamethonium for one to three years. The table shows that there is no relationship between alleviation of dyspnœa and lowering of blood-pressure, and it must therefore be assumed that, even when the blood-pressure control is far from continuous, the treatment produces a significant effect on the cardiac condition.

### Cardiovascular Complications

The total incidence of cardiovascular complications in our series is shown in table III. In no case has heart-failure developed during treatment with hexamethonium. Attempts to relieve congestive heart-failure due to hypertension by blood-pressure control alone have failed, and this method of treatment cannot vie with digitalis and mersalyl in bringing swift relief, although ganglion-blocking agents may prevent recurrence of heart-failure.

TABLE III—TOTAL INCIDENCE OF CARDIOVASCULAR COMPLICATIONS AMONG 114 HYPERTENSIVE PATIENTS TREATED WITH HEXAMETHONIUM

| Complication | No. of cases | Time relation to therapy |
|---|---|---|
| Congestive heart-failure .. | 6 | All existed before treatment |
| Left ventricular failure .. | 14 | |
| Incipient left ventricular failure .. .. .. | 6 | |
| Angina pectoris .. .. | 8 | All pre-existed; much improved |
| Cardiac infarction .. .. | 7 | 3 before treatment; 4 during (2 died) |
| Strokes .. .. .. | 12 | 5 before treatment; 6 during (5 died); 1 before and after (died) |
| Raynaud's phenomenon .. | 1 | During therapy |
| Gangrene .. .. .. | .. | .. |

* A paper read at the Second World Congress of Cardiology in Washington, U.S.A., on Sept. 16, 1954.

In our experience the existence of myocardial ischæmia by no means precluded treatment with hexamethonium. In fact, when considerable hypertension was associated with angina, the control of the hypertension often brought a lessened incidence of pain. Cardiac infarction had taken place in 3 cases before treatment was started. Of the 4 cases of cardiac infarction occurring during hexamethonium treatment only 1 appeared to be directly related to the sudden fall of blood-pressure. Of the seven strokes witnessed in the course of this treatment a similar relationship was observed once.

### Causes of Death

There were 14 deaths during the follow-up period in our series. The mortality was due to strokes (6) and uræmia (5), and there were 2 deaths from cardiac infarction and 1 from an unknown cause. There were no deaths from heart-failure. These figures suggest that this therapy has caused a complete change in the mortality pattern of hypertension. It appears that heart-failure is prevented, with the result that deaths from cerebral catastrophe may take place, just as insulin has reduced the coma death-rate while increasing that from arterial disease. There is no evidence, on the other hand, that hexamethonium treatment is attended by a special liability to either hæmorrhage or thrombosis. The 2 instances already mentioned of thrombosis occurring when blood-pressure was at its lowest were both treated with watery solutions of hexamethonium bromide and not with the retard preparation used in all the later cases to ensure a slower and steadier absorption. 6 patients had strokes before treatment, and 1 of them had a fatal recurrence after treatment. Among 8 patients with angina pectoris and 3 with cardiac infarction occurring before therapy there were no thromboses after the beginning of treatment.

It has been argued that cerebral hæmorrhage is related to fluctuation in the level of blood-pressure rather than to the height of the blood-pressure itself. Though hexamethonium does cause substantial alterations of blood-pressure these are less than those which the hypertensive patient undergoes as the result of physical exertion. Fowler and Guz (1954) showed the protective influence exerted by hexamethonium bromide on hypertensive people during exercise. It is therefore probable that fluctuations of blood-pressure during treatment with the patient up and about are less than those which might be expected without treatment.

### Discussion

Gilmore et al. (1952) found that the introduction of hexamethonium bromide through a cardiac catheter was followed by a fall of systemic and pulmonary arterial pressure, cardiac output being little altered. It is reasonable to infer that the work of the heart was thereby lessened, and that heart-failure might be relieved and averted. That this result might be achieved was shown by Kelley et al. (1953), who treated patients in congestive heart-failure of various types by intravenous injections of hexamethonium bromide 30 mg. They found reduction in arterial pressure (and of venous pressure, if raised) and in most patients a quickened circulation-time, improved vital capacity, and alleviation of symptoms, notably orthopnœa. Similar results were found by Shuman et al. (1954), who showed that autonomic blockade was an effective means of relieving pulmonary congestion in heart-failure. In short, the changes expected during relief of congestive failure were observed.

A mathematical demonstration of the reduction of the work of the heart as a result of the action of hexamethonium has been given by Johnson et al. (1954), who have emphasised that hypertension often accounts for the persistence of intractable heart-failure. By cardiac catheterisation they have measured left ventricular work before and immediately after intravenous injection of hexamethonium. They found that left ventricular work was decreased from 182 to 46 joules per minute. That the expected clinical results of such treatment on hypertensive left ventricular failure may be obtained has been recorded by Smirk (1954). In 20 of 36 severe hypertensives with either congestive heart-failure or cardiac asthma there were relief from symptoms and return to a range of activity appropriate for their time of life. In these patients such treatment was not supplemented by digitalis or mercurial diuretics or by salt depletion.

For hypertensive left ventricular failure the basis of treatment must be: (1) to improve the power of the heart; (2) to ensure that the heart receives all the aid that advantageous circumstances can give; and (3) to lessen the work demanded of the left ventricle. Under (1) digitalis should be given. To secure (2) the patient should be propped up in the feet-down posture of the cardiac bed, and body-fluid depletion should be secured by salt and fluid restriction. The accomplishment of (3) must be through lessening the pressure in the systemic circuit. How effective continuous control of blood-pressure may be in this direction has already been shown. It has likewise been demonstrated that a substantial lowering of blood-pressure for even eight or twelve of the twenty-four hours may sufficiently lighten the work of the heart for the symptoms and signs of left ventricular failure to be resolved. This effect of pressure reduction is so potent that it may in many cases, without any additional measures, bring about dramatic and continuing relief from acute or chronic left ventricular failure, if this is the consequence of hypertension.

### Summary

A series of 114 patients under treatment with hexamethonium bromide for hypertension were studied, with special reference to the incidence and control of heart-failure.

It was found that this treatment could not take the place of digitalis and mersalyl in the initial treatment of congestive heart-failure, but by controlling the pressure it might prevent recurrence.

If left ventricular failure existed when the patient came under treatment it was generally relieved by hexamethonium bromide. In a few cases digitalis contributed to the control exerted by hexamethonium bromide. Dyspnœa lessened and cardiac asthma no longer occurred, and angina and gallop rhythm, if present, disappeared.

There was no death from heart-failure, which is ordinarily the commonest termination of hypertensive heart-disease. Among the 14 deaths, strokes and uræmia were the main and nearly equal causes.

We consider that the main and attainable purpose of hexamethonium treatment is the prevention of left ventricular failure.

Side-effects may be formidable and demand relaxation of treatment; even so, when there is incomplete control of pressure, the main aim of preventing heart-failure may still be achieved.

Our thanks are due to Dr. Vincent Edmunds, who allowed us to make use of data from some patients under his care at Mount Vernon Hospital, Northwood.

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# AN IMPROVED METHOD FOR CLINICAL STUDIES OF TOTAL EXCHANGEABLE SODIUM

## USING $^{22}Na$ AND A WHOLE-BODY COUNTING TECHNIQUE

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THE isotope-dilution technique has become an established method for studies on body composition, both in health and in disease (Moore 1946), and is important in clinical biochemical research (Edelman et al. 1952).

The present report is confined to the determination of "total exchangeable sodium," a measurement which has been found applicable to numerous clinical problems by various workers and is typical of isotope-dilution measurements generally.

The measurement of exchangeable sodium usually involves the use of the 15-hour half-life isotope $^{24}Na$—e.g., Miller and Wilson (1953). The required figure is derived from the formula:

$$Na_E = \frac{^{24}Na \text{ administered} - ^{24}Na \text{ excreted in urine}}{^{24}Na \text{ per m.eq. } ^{23}Na \text{ in plasma}}$$

In practice 12–24 hours is usually regarded as sufficient for the $^{24}Na$ to reach equilibrium with the exchangeable sodium in the body; the source of the body-sodium sample for analysis then becomes immaterial, and a specimen of urine serves the purpose.

The 2·6-year half-life isotope $^{22}Na$ has been used for studying the biological decay-rate or turnover of sodium (Burch et al. 1947); continuous measurements of the amount of tracer excreted are made to obtain a graph of body $^{22}Na$ content as a function of time. Burch et al. (1949) have shown mathematically how the intake and excretion rates, the exchangeable body-sodium, and the biological decay-rate are interrelated.

The technique described here permits the direct measurement of the biological decay-rate and serial measurements of exchangeable sodium. The essential features of the method are the use of long-lived $^{22}Na$, together with an apparatus for measuring radioactivity in the whole body, so that, in effect, the numerator in the formula above is measured directly.

### Methods

*Preparation of $^{22}Na$* *

The radioactive sodium was prepared by deuteron bombardment of magnesium in the University of Birmingham cyclotron. The target material was dissolved in HCl, and after the addition of NaCl carrier the magnesium was precipitated as magnesium hydroxide and magnesium ammonium phosphate. The stock solution was made up to contain 20 μC of $^{22}Na$ per ml. of isotonic saline solution. This was diluted with water for oral administration. The activity was measured with a 4π Geiger-Müller counter (Gray 1952).

*Measurement of Whole-body Radioactivity*

The apparatus in current use is shown schematically in fig. 1. Eight gamma-ray counter-tubes (20th Century Electronics type G 24) are lashed to a frame, in this case an ordinary hospital-ward screen. The tubes were matched by the manufacturers to have the same operating voltage; they are connected in parallel to a Probe Unit 1014A and thence to a conventional scaler and E.H.T. unit. Measurements made by moving a small bottle containing $^{22}Na$ in two planes show a large region in the centre of the apparatus where movement of the source has relatively little effect on the counting-rate. The person to be examined stands in the centre as shown in fig. 2. With a person of average size a dose of 50 μC of $^{22}Na$ corresponds to a counting-rate of about 10,000 counts per minute (c.p.m.). The background count in the absence of nearby artificial radioactive sources is about 800 c.p.m.

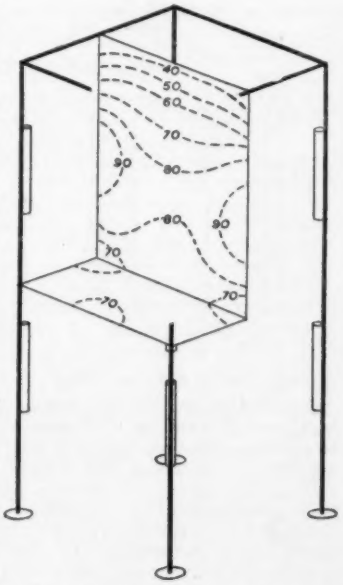


Fig. 1—Schematic drawing of whole-body counting-equipment, showing lines of equal sensitivity.

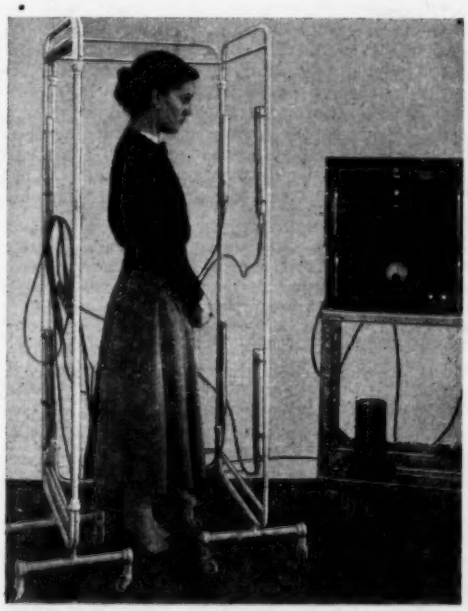

Fig. 2—Whole-body counting-equipment made from hospital-ward screen.

* This material is obtainable from the Atomic Energy Research Establishment, Harwell.

TABLE I—CONSISTENCY OF WHOLE-BODY ACTIVITY MEASUREMENTS FOR 6 HOURS

| Time (hr.) | Observed counting-rate (c.p.m.) | Counting-rate corrected for excretion (c.p.m.) |
|---|---|---|
| 3·7 | 21 400 | 21,400 |
| 4·0 | 21,280 | 21,280 |
| 4·15 | 21,200 | 21,380 |
| 4·6 | 21,200 | 21,380 |
| 4·65 | 20,950 | 21 130 |
| 4·9 | 21,020 | 21,200 |
| 6·45 | 21,000 | 21,180 |
| 6·9 | 21,020 | 21,200 |
| 7·5 | 21,000 | 21,180 |
| 7·85 | 20,900 | 21,200 |
| 8·25 | 20,900 | 21,200 |
| 8·65 | 20,850 | 21,250 |
| 9·35 | 21,000 | 21,300 |
| | | Mean 21,237 |
| | | $\sigma = \pm$ 0·52% |

*Measurement of $^{22}Na$ in Urine*

Spot urine samples are stored in small 'Polythene' bottles while awaiting measurement, to avoid errors due to exchange between $^{22}Na$ and the $^{23}Na$ in glass. Radioactivity was measured with a liquid sample beta-counter tube (20th Century Electronics type M 6) but a multi-tube gamma-counting equipment (Veall and Baptista 1954) was later found to be slightly more sensitive, and much more convenient in practice. A prototype scintillation-counter for liquid samples ('EKCO' type N550) has also been tested; this is about eleven times more sensitive than the equipment using Geiger tubes, and a further increase in sensitivity is obtained if the 10-ml. sample cup supplied by the manufacturer can be replaced by a larger one. The radioactivity of each urine sample is compared with that of an aliquot of the administered dose, at least 10,000 counts being recorded on each sample.

*Determination of $^{23}Na$ in Urine*

Chemical sodium determinations are made by means of an EEL flame photometer (Evans Electroselenium Ltd.), using external standards. All samples and standards are kept in polythene bottles.

## Experimental

Preliminary experiments were made with 15-hour $^{24}Na$ obtained from the Atomic Energy Research Establishment, Harwell. These included measurements made on the whole-body counting equipment after the oral administration of $^{24}NaCl$ in solution, to observe the effect of non-uniform distribution of the isotope; experiments to check the reproducibility of measurements after equilibration of the isotope; and a limited series of calibrations of the equipment made to obtain an estimate of the effect of the size and shape of the person under investigation.

TABLE II—RESULTS OF PAIRED OBSERVATIONS OF TOTAL EXCHANGEABLE SODIUM FOR A HEALTHY MAN

| Days after dose | Exchangeable sodium (m.eq.) | | Ratio A/B |
|---|---|---|---|
| | A | B | |
| 1 | 2959 | 3183 | 0·9296 |
| 4 | 2731 | 3059 | 0·8928 |
| 5 | 3219 | 3181 | 1·0119 |
| 6 | 3067 | 3016 | 1·0169 |
| 7 | 2932 | 2989 | 0·9809 |
| 8 | 3029 | 3034 | 0·9983 |
| 12 | 2724 | 2995 | 0·9095 |
| 13 | 3023 | 3152 | 0·9590 |
| 15 | 3109 | 3324 | 0·9353 |
| 18 | 3463 | 3352 | 1·0331 |
| 19 | 3022 | 3121 | 0·9683 |
| 20 | 3352 | 3303 | 1·0148 |
| 21 | 3026 | 3037 | 0·9964 |
| 22 | 3621 | 3562 | 1·0167 |
| | | | Mean 0·9760 |
| | | | Coefficient of variation: ±4·35% |

Normal healthy people were used; they were engaged on ordinary hospital duties, and there was no variation from their normal routine or diet. About 30 μC of $^{22}Na$ was given orally, not necessarily with the person fasting. After several hours the first measurement of whole-body activity was made (initial activity) and corrected for urinary excretion, if any. On the following day and at intervals thereafter the whole-body counting-rate was measured, the bladder having been voided immediately beforehand. The urine sample so obtained was used for radioactivity and chemical determinations.

In one case the subject was given 25 μC of $^{22}Na$. For three weeks an additional dose was given each day, immediately after the whole-body count had been made, the dose being calculated to maintain the whole-body count at a steady value. Subsequently the fall in body activity was followed in the usual way.

## Results

*Performance of Whole-body Counter*

Immediately after the subject had taken an oral dose of $^{24}Na$ the whole-body counting-rate was found to be about 30% less than the equilibrium value. The counting-rate increased with time until, after 1–2 hours, a steady value was reached.

Measurements of whole-body activity made over about 6 hours are shown in table I. Measurements were begun after sufficient time had been allowed for effectively

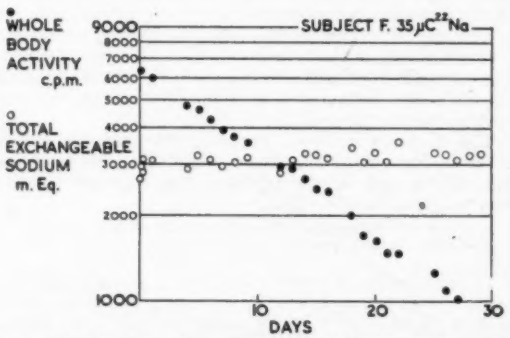


Fig. 3—Whole-body activity and apparent total exchangeable sodium after single tracer dose of $^{22}Na$.

complete equilibration. The coefficient of variation of a single measurement, after correction for excretion, was ± 0·5%, which is equal to the coefficient of variation to be expected if a measurement is based on 40,000 counts, as these were.

*Accuracy of Determination of Exchangeable Sodium*

The results of pairs of measurements of exchangeable sodium in the same person are shown in table II. These measurements were made about 3 hours apart, usually at about 11 A.M. and 2 P.M. each day. It can be seen from the ratios in the third column that usually the intervening midday meal leads to an increase of about 2·5% in the amount of exchangeable sodium. Even with the uncertainty regarding the intake and excretion between the two measurements the data yield a coefficient of variation for the ratio of ± 4·35%; hence the corresponding figure for a single measurement is ± 3%.

*Serial Measurements*

The whole-body activity, the specific activity of the urine sodium, and the exchangeable sodium calculated from these two quantities are shown in fig. 3 for a healthy man after a single dose of 35 μC of $^{22}Na$. The same data for another person, who received an initial dose of 25 μC and daily supplementary doses for 3 weeks thereafter, are shown in fig. 4.

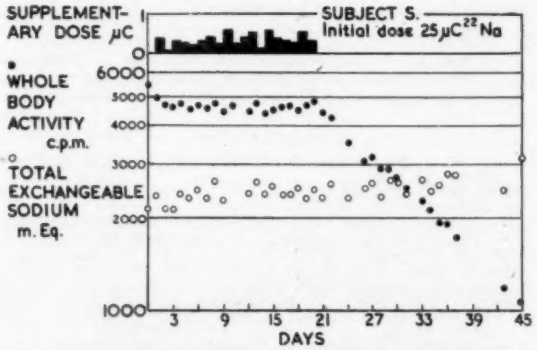


**Fig. 4—Whole body activity and apparent exchangeable sodium with supplementary doses of ²²Na.**

The curve for total-body activity is of the expected logarithmic form, the biological half-life being about 11 days. This is in agreement with the results of Miller et al. (1954) and Burch et al. (1949). The curves for exchangeable sodium show an apparent slight increase with time as the $^{22}Na$ is excreted.

## Discussion

Immediately after an oral dose the $^{22}Na$ is in the gastro-intestinal tract. Most of the radioactivity is thus situated in the region of minimal sensitivity of the whole-body counter, and there is also a considerable reduction in counting-rate due to the absorption of gamma radiation by the rest of the body. As the isotope becomes more uniformly distributed, the counting-rate increases but is sufficiently constant after 3 hours to allow a calibration figure (in counts per minute per microcurie) to be obtained for the person under study. This calibration figure varies widely from person to person, depending both on size and shape; hence calibration in this way is necessary in each case.

From the known standard errors of the individual measurements involved, the measurement of exchangeable sodium is calculated to have a standard error of $\pm$ 2·5%, which agrees with the degree of reproducibility shown in table II. However, measurements made from day to day on the same person show considerably wider variations than this—in most cases about $\pm$ 5% or more. This is presumably due to daily variations in intake and excretion of sodium. Probably the relatively wide range of values for exchangeable sodium in healthy people reported by previous workers (summarised by Arons et al. 1954) are due, at least partly, to these daily variations. Arons et al. (1954), discussing the wide range of normal values, suggest that changes in the electrolyte content of the body are likely to be of greater clinical importance than the values obtained from single observations. The present method, by reason of the frequent measurements which can be made, not only permits more detailed study of short-period fluctuations but also makes it easier to discern relatively long-term trends.

Previous workers (Burch et al. 1952, Miller et al. 1954) obtained results which suggest that the exchange of sodium continues at least up to 96 hours after administration of the tracer. By external counting over the patella Miller et al. obtained direct evidence in support of the suggestion that the slowly equilibrating component is primarily sodium in bone. On the other hand, Edelman et al. (1954) reported that 45% of bone-sodium is exchangeable in 4 hours, and found no evidence of further exchange in the next 20 hours in man, or in 1 month in dogs on a low-sodium diet.

In the present experiments the apparent increase in exchangeable sodium, as the tracer is excreted, is consistent with the assumption that some of the $^{22}Na$ is associated with slowly exchanging sodium in the body, with the result that its excretion is delayed and the measured specific activity of the excreted sodium is lower than the average specific activity of the total exchangeable sodium. The data shown in fig. 4, where the effects of excretion have been largely balanced out, together with the data of Miller et al. (1954), support the conclusion that about 10% of the total exchangeable sodium, represented by the difference between "24-hours" exchangeable sodium and "7-days" exchangeable sodium, can be regarded as forming a separate compartment, the equilibration of $^{22}Na$ between this compartment and the extracellular fluid being characterised by a half-life of about 2 days. The mathematical theory of the distribution of a tracer substance in multi-compartment systems of this type has already been discussed by Solomon (1949). After about 7 days equilibration appears to be complete. That the $^{22}Na$ in bone is not fixed is confirmed by the finding that in a healthy person after 75 days (7 half-lives) less than 1% of the administered dose remained in the body.

In studies extending over several weeks, with people whose excretion of sodium is normal or near normal, uncertainties in interpretation can be reduced by adopting a procedure whereby an initial dose of about 25 μC of $^{22}Na$ is followed at intervals of 7–10 days by supplementary doses of about 10 μC each. This avoids excessively high counting-rates in the early stages and, subsequently, the inordinately long measurements needed for very low counting-rates. The same procedure also eliminates a major source of error in the method: any changes of weight or shape of the subject, such as those associated with gross œdema and particularly those found in obstetrical studies, will lead to appreciable changes in the calibration factor of the whole-body counter. The administration of supplementary doses provides opportunities for checking the calibration of the equipment. With this system of dosage the greater part of the slowly exchangeable sodium is included in the figure obtained, and it is more certain that the sodium associated with cellular, amniotic, ascitic, and pleural fluids is included than is the case when only the 24-hour exchangeable sodium is measured.

Previous workers who have studied the radioactivity of the whole body (Burch and Spiers 1953, Reines et al. 1953) have been concerned with the measurement of quantities of about 0·01 μC of the naturally occurring radioactive elements. This presents considerable technical problems and involves the use of complex equipment. In the present case the magnitude of the dose used is determined by the amount which can be measured in samples of urine or of plasma, and the building of apparatus with adequate sensitivity for the whole-body radioactivity measurement presents no difficulties. For instance, although the limit to the sensitivity of the apparatus is set by the background counting-rate, it has not so far proved necessary to use any lead shielding round the counters. In the present apparatus it is also found that, for practical purposes, the effect of the natural radioactivity of $^{40}K$ is balanced by the background shielding effect of the subject's body. Thus, a count taken on one person before administration of $^{22}Na$ gave 10$\pm$9 c.p.m. for the body background.

Our own unpublished data confirm the conclusion reached by Arons et al. (1954) that simultaneous measurements of exchangeable sodium and potassium are probably of greater interest and value than either quantity alone. The technical problems involved in the double-tracer technique are greatly reduced if the method described here is used for the sodium measurements, while $^{42}K$ (12·4-hour) is used in the conventional manner (Corsa et al. 1950) for the potassium measurements. Owing to the widely different decay-rates and radiations of $^{22}Na$

and $^{42}K$ the measurement of samples containing both of these isotopes is comparatively easy (Tait and Williams 1952). The use of $^{22}Na$ also represents a considerable financial saving compared with $^{24}Na$, because the frequent shipments and high wastage due to radioactive decay are avoided.

The main advantage of the present method lies in the fact that complete collection of all excreta is unnecessary, and the possibility of loss of sodium in sweat does not have to be considered. The method thus lends itself particularly well to environmental studies. Measurements on healthy volunteers are greatly facilitated; clinical studies can now be made in the antenatal and outpatient clinics instead of in the metabolic ward, and the patient is not subjected to inconvenience or to emotional stress. The whole-body counting-apparatus is a relatively inexpensive attachment to the now widely available radioactivity-measuring equipment and can be varied considerably to meet different requirements. Thus it is relatively simple to adapt the apparatus for measurements on bed patients. Apart from electrolyte studies, the technique is generally applicable to any problem where the absorption or retention of a gamma-emiting radioactive isotope in the body is of interest.

*Radiation Dosage*

The 2·6-year half-life of $^{22}Na$ gives rise to some misgivings about the radiation dosage received by the subject. However, the effective half-life in the body is determined by the excretion-rate and is about 2 weeks. There is no evidence of any permanent retention. The currently accepted figure for the maximal permissible radiation dose-rate for continuous exposure is 0·3r per week (International Commission on Radiological Protection 1954), and the maximal permissible body-burden of $^{22}Na$ corresponding to this dose-rate can be calculated (Mayneord and Sinclair 1953). For a person weighing 70 kg. this amounts to about 50 μC. In the present studies it has not been found necessary to exceed this figure at any time, and measurements were usually made at about half this activity level. It therefore appears that, so far as radiation dosage is concerned, observations could be continued on the same person indefinitely.

A. H. James (personal communication) has pointed out, however, that the possibility of the incorporation of appreciable amounts of $^{22}Na$ in the "non-exchangeable" bone-sodium in cases where mineralisation of bone tissue is occurring has not been excluded. The use of this isotope in late pregnancy with a viable fœtus, or in growing children, is thought to be inadvisable until the results of further experimental studies are known.

**Summary**

The fraction of a tracer dose of a gamma-emitting isotope which remains in the body after a given time can be measured by a simple Geiger-Müller counter system.

Using $^{22}Na$ this technique permits direct measurement of the biological decay-rate and serial measurements of total exchangeable sodium. The biological half-life for healthy people is about 11 days. The standard error of a single measurement of total exchangeable sodium is ±3%.

About 10% of the total exchangeable sodium takes several days for complete equilibration; uncertainties due to this and to calibration errors caused by changes in shape or size of the subject can be reduced by suitably fractionating the administered tracer dose.

Body-sodium measurements may be continued indefinitely on the same person without exceeding the permissible maximum of radiation dosage figure of 0·3r a week.

The technique is simple and enables studies to be made on hospital outpatients. The whole-body counting-technique is applicable in a wide variety of other clinical investigations.

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# LOW-FAT DIET AND THERAPEUTIC DOSES OF INSULIN IN DIABETES MELLITUS

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THERE is no indication that healthy people taking a diet rich in carbohydrates are especially liable to diabetes; in fact numerous observations show improvement of carbohydrate tolerance following its greater intake. The Staub-Traugott effect is a classical example of this in acute experiments. As a long-term effect diabetes mellitus is not especially common among the huge and mainly carbohydrate-eating populations of the world—e.g., the Chinese—except the rich and the sedentary among them who partake of large quantities of fat as well and encourage obesity by overeating.

Although it is theoretically possible that in such circumstances the islets of Langerhans can be exhausted, there is no experimental proof that this happens. Allan (1923) showed that the relationship between the carbohydrate ingested and the insulin necessary to metabolise it was approximately logarithmic; hence the strain on the insulin mechanism is relatively small. Moreover it is impossible to improve to any great extent nervous hypoglycæmia by treatment for months with a diet containing a very large quantity of carbohydrates.

Even diabetics tolerate a high-carbohydrate diet.

Strouse and Soskin (1932) found that increased intake of carbohydrate from 72 to 290 g. in isocaloric diets of diabetics did not increase the demand on insulin, and the glycosuric effect remained more or less the same.

Jackson and Kenefick (1942) recorded similar findings in diabetic children.

Rabinowitch (1949) claimed that inclusion of 20–80 g. of sucrose in a diabetic diet definitely reduced the insulin requirements.

Soffer and Gabrilove (1951) cite a man, aged 65, who had diabetes for fifteen years and took 50–60 teaspoonfuls of sucrose in various forms in addition to his normal diet throughout his illness without deteriorating further in any way, his insulin requirements remaining constant at 40 units of protamine-zinc insulin daily. This diabetic never had

ketosis or pyogenic infections despite glycosuria equivalent to 50–60 g. of glucose.

Ellis (1934), who treated some cases of severe diabetes with 600 g. of glucose daily in lieu of restricted diet and on identical doses of insulin, found that, instead of deteriorating in any way, some of the patients showed increased carbohydrate tolerance. In one case this effect was striking: after 21 days' treatment the insulin requirements were reduced from 192 units to 9 units daily.

Fat, however, depresses the insulin mechanism. Himsworth (1934, 1935) confirmed the findings of earlier workers that a high-carbohydrate diet increases sugar tolerance whereas a high-fat diet decreases it, and showed that the result was solely due to the increased amount of carbohydrates in the diet. Each unit of insulin in these circumstances metabolises a greater amount of glucose (see above).

Since these findings the tendency has been to abandon high-fat low-carbohydrate diets in the treatment of diabetes and to give a diet containing a normal or a smaller than normal amount of fat, a normal amount of carbohydrate, and a normal amount of protein with adequate insulin. The findings described here suggest that, if fat is reduced still further to the minimum, insulin begins to exert its curative effect, most patients can be stabilised progressively on diet alone, and some patients are to all intents and purposes cured. Apparently, when a diet very low in fat is given, the diabetogenic stimulus is minimised, and insulin in adequate amounts can then cure diabetes, as has been shown experimentally by Haist et al. (1940) and Lukens and Dohan (1942).

## Methods

### *Selection of Patients*

All the cases were of insulin-sensitive diabetes. Of the 80 patients 6 were female and 74 male; and 17 were 5–23 lb. overweight for their age, height, body-frame, and sex, the remaining 63 being from normal to 45 lb. underweight. Except 1 child aged 13 and 2 men aged 66–80, the patients were aged 26–58. Ketonuria was found in 14 and glycosuria alone in 66. 23 apparently had no symptoms, and of the remaining 57 patients 2 were picked up semicomatose and 55 complained of symptoms ranging from weakness to all the classical symptoms of diabetes mellitus. None of them had any septic complications.

Apart from the initial glucose-tolerance test on each patient it was impossible to estimate the blood-sugar level frequently, because of the cost. Accordingly only patients with an approximately normal renal threshold were selected for treatment to enable day-to-day observations to be made on the urine. Where the fasting blood-sugar level was higher than 190 mg. per 100 ml. and the normality of renal threshold could not initially be decided, results of single blood-sugar estimations and of urine examinations done two hours after a meal at intervals while the diabetic state was coming under progressive control with treatment helped to determine whether the renal threshold was normal or not. The results of the initial glucose-tolerance tests are given in table I to give an idea of the types of cases treated.

### *Diet*

The patients without ketosis were allowed unrestricted high-carbohydrate diet without insulin for the week before the initial glucose-tolerance test. Subsequently they were put on a diet of required caloric value for them for treatment purposes. This diet contained 20–30 g. of fat and 120–150 g. of protein, and the rest of the caloric requirement was made up by carbohydrates excluding free sugar. The caloric value was based on energy requirements and calculated for a shift of the body-weight towards 5–10 lb. below normal at the rate of 2–3 lb. increase in the underweight and a similar decrease in the overweight per month. Apart from the patients who were grossly underweight and received as much as 4000–4500 calories a day, the caloric value of the diet in the remaining cases was 1600–2200 calories. Subsequently, with improvement in the diabetic process, however, many patients started losing weight on their original diets, and the caloric value had to be increased accordingly. There were three main meals: breakfast, luncheon, and dinner, of about $^2/_8$, $^3/_8$, and $^3/_8$ of the total caloric value and given at 8 A.M., 1 P.M., and 8 P.M. respectively. Minor variations for bed tea, afternoon tea, and a bedtime drink were allowed for convenience and satisfaction of patients.

TABLE I—RESULTS OF INITIAL GLUCOSE-TOLERANCE TESTS

| Case no. | Blood-sugar (mg. per 100 ml.) | | | | | |
|---|---|---|---|---|---|---|
| | Fasting | After 50 g. of glucose | | | | |
| | | ½ hr. | 1 hr. | 1½ hr. | 2 hr. | 2½ hr. |
| 1 | 266 | 296 | 333 | 400 | 366 | .. |
| 2 | 192 | 201 | 258 | 333 | 289 | .. |
| 3 | 108 | 228 | 263 | 202 | 138 | .. |
| 4 | 222 | 296 | 333 | 320 | 307 | .. |
| 5 | 117 | 216 | 230 | 142 | 133 | .. |
| 6 | 100 | 238 | 254 | 153 | 111 | .. |
| 7 | 275 | 339 | 363 | 322 | 285 | .. |
| 8 | 324 | 400 | 476 | 392 | 380 | .. |
| 9 | 212 | 234 | 276 | 300 | 284 | .. |
| 10 | 614 | 666 | 676 | 644 | 634 | .. |
| 11 | 216 | 245 | 312 | 298 | 250 | .. |
| 12 | 192 | 250 | 312 | 306 | 288 | .. |
| 13 | 363 | 373 | 416 | 408 | 370 | .. |
| 14 | 190 | 250 | 296 | 322 | 307 | .. |
| 15 | 228 | 245 | 312 | 285 | 253 | .. |
| 16 | 126 | 222 | 258 | 266 | 250 | .. |
| 17 | 180 | 278 | 307 | 279 | 232 | .. |
| 18 | 439 | 454 | 570 | 400 | 328 | .. |
| 19 | 184 | 275 | 294 | 294 | 250 | .. |
| 20 | 276 | 362 | 400 | 384 | 362 | .. |
| 21 | 220 | 380 | 430 | 440 | 330 | .. |
| 22 | 173 | 272 | 312 | 254 | 182 | .. |
| 23 | 470 | 533 | 579 | 579 | 500 | .. |
| 24 | 266 | 307 | 363 | 333 | 285 | .. |
| 25 | 151 | 166 | 216 | 210 | 198 | .. |
| 26 | 285 | 230 | 339 | 320 | 289 | .. |
| 27 | 187 | 200 | 261 | 296 | 314 | .. |
| 28 | 199 | 234 | 266 | 292 | 250 | .. |
| 29 | 174 | 205 | 280 | 286 | 266 | 222 |
| 30 | 190 | 333 | 423 | 533 | 333 | 313 |
| 31 | 235 | 333 | 400 | 500 | 400 | 333 |
| 32 | 152 | 222 | 272 | 272 | 260 | 166 |
| 33 | 272 | 375 | 333 | 272 | 250 | .. |
| 34 | 250 | 428 | 500 | 428 | 375 | .. |
| 35 | 375 | 423 | 500 | 500 | 430 | 375 |
| 36 | 110 | 200 | 300 | 280 | 250 | 170 |
| 37 | 160 | 300 | 280 | 280 | 260 | 240 |
| 38 | 110 | 186 | 200 | 220 | 170 | 120 |
| 39 | 253 | 381 | 454 | 400 | 388 | .. |
| 40 | 160 | 262 | 296 | 315 | 285 | .. |
| 41 | 142 | 250 | 275 | 238 | 198 | .. |
| 42 | 230 | 312 | 347 | 281 | 247 | .. |
| 43 | 86 | 166 | 224 | 216 | 202 | .. |
| 44 | 250 | 360 | 408 | 372 | 333 | .. |
| 45 | 146 | 198 | 235 | 222 | 209 | .. |
| 46 | 173 | 186 | 198 | 238 | 205 | .. |
| 47 | 347 | 398 | 421 | 444 | 400 | .. |
| 48 | 123 | 258 | 320 | 285 | 205 | .. |
| 49 | 111 | 181 | 194 | 208 | 200 | .. |
| 50 | 420 | 500 | 518 | 487 | 470 | .. |
| 51 | 117 | 208 | 250 | 253 | 234 | .. |
| 52 | 416 | 500 | 571 | 512 | 487 | .. |
| 53 | 125 | 186 | 242 | 258 | 250 | .. |
| 54 | 117 | 186 | 216 | 228 | 204 | .. |
| 55 | 145 | 230 | 250 | 228 | 181 | .. |
| 56 | 212 | 307 | 420 | 400 | 374 | .. |
| 57 | 186 | 250 | 266 | 275 | 242 | .. |
| 58 | 115 | 173 | 220 | 228 | 168 | .. |
| 59 | 95 | 190 | 228 | 210 | 166 | .. |
| 60 | 111 | 235 | 250 | 228 | 129 | .. |
| 61 | 400 | 420 | 500 | 532 | 470 | .. |
| 62 | 121 | 228 | 275 | 258 | 200 | .. |
| 63 | 148 | 258 | 275 | 250 | 234 | .. |
| 64 | 222 | 270 | 320 | 347 | 370 | .. |
| 65 | 116 | 216 | 280 | 260 | 208 | .. |
| 66 | 138 | 190 | 235 | 258 | 228 | .. |
| 67 | 119 | 186 | 224 | 222 | 216 | .. |
| 68 | 216 | 296 | 400 | 357 | 333 | .. |
| 69 | 125 | 266 | 228 | 200 | 142 | .. |
| 70 | 600 | 726 | 800 | 888 | 1000 | .. |
| 71 | 125 | 242 | 266 | 285 | 296 | .. |
| 72 | 96 | 204 | 235 | 275 | 228 | .. |
| 73 | 150 | 230 | 325 | 280 | 240 | .. |
| 74 | 172 | 184 | 240 | 242 | 222 | .. |
| 75 | 97 | 186 | 228 | 218 | 166 | .. |
| 76 | 87 | 161 | 258 | 242 | 155 | .. |
| 77 | 114 | 163 | 213 | 205 | 164 | .. |
| 78 | 128 | 232 | 222 | 222 | 166 | .. |
| 79 | 435 | .. | .. | .. | .. | .. |
| 80 | 520 | .. | .. | .. | .. | .. |

*Method of Administration and Dosage of Insulin*

The patients who had been on diet for 7–10 days and still had glycosuria were put on relatively large doses of insulin calculated to leave a slight excess after counteracting the glycosuria completely. The initial dose of insulin was approximately determined by allowing a unit of insulin for each gramme of glucose excreted in the urine in twenty-four hours and adding 5–10 units of extra insulin to this amount. This dose counteracted the glycosuria in most cases except the severest, which needed somewhat higher doses.

Calculated in this way the initial dose of insulin was between 30 units in milder cases to 120 units in the severer ones, and was given as protamine-zinc insulin half an hour before breakfast. When the patient had been free from glycosuria for 48–72 hours the dose of insulin was reduced by 5–10 units till the patient was sugar-free again for the same length of time. This was repeated till either no insulin was required or the minimal dose of insulin had been reached. This procedure, which progressively increased carbohydrate tolerance, was applied to 10 patients, who became just sugar-free on diet alone. They received 20 units of protamine-zinc insulin initially to be reduced by 5 units every five days till none was to be given.

TABLE II—FINAL RESULTS OF TREATMENT IN 7 CASES

| Case no. | — | Blood-sugar (mg. per 100 ml.) | | | | | |
|---|---|---|---|---|---|---|---|
| | | Fasting | After 50 g. of glucose | | | | |
| | | | ½ hr. | 1 hr. | 1½ hr. | 2 hr. | 2½ hr. |
| 1 | Initial | 266 | 296 | 333 | 400 | 366 | .. |
| | Final | 90 | 172 | 156 | 115 | 92 | .. |
| 24 | Initial | 266 | 307 | 363 | 333 | 285 | .. |
| | Final | 90 | 126 | 160 | 97 | 96 | .. |
| 44 | Initial | 250 | 360 | 408 | 372 | 333 | .. |
| | Final | 90 | 148 | 160 | 153 | 142 | 100 |
| 79 | Initial | 435 | Not done, patient had severe ketosis | | | | |
| | After 9 weeks | 168 | 177 | 204 | 209 | 190 | 157 |
| | Final | 103 | 180 | 165 | 146 | 113 | .. |
| 80 | Initial | 520 | Not done, patient had severe ketosis | | | | |
| | After 9 weeks | 114 | 172 | 212 | 208 | 180 | .. |
| | Final | 88 | 170 | 177 | 167 | 101 | 76 |
| 48 | Initial | 123 | 258 | 320 | 285 | 205 | .. |
| | Final | 108 | 206 | 258 | 210 | 129 | .. |
| 68 | Initial | 216 | 296 | 400 | 357 | 333 | .. |
| | Final | 128 | 210 | 190 | 175 | 150 | .. |

There was never any danger of excessive dosage of insulin. The initial amounts given were only slightly above the doses which counteracted glycosuria completely. Reduction by 5–10 units at a time subsequently within a few days generally allowed some glycosuria after one or more meals before being controlled again. Hypoglycæmic reactions were further avoided by adequate spacing, in time and quantity, of meals. It will be noticed that the caloric values of luncheon and dinner were the same, and dinner was late. This helped to prevent trouble from nocturnal hypoglycæmia even when the initial dose of protamine-zinc insulin was 120 units.

Urine was tested for glycosuria before breakfast and two hours after breakfast, luncheon, and dinner every day. All the samples had to be sugar-free for 48–72 hours before the insulin dosage was reduced.

## Results

Of the 80 patients 50 became sugar-free in 3–6 weeks and did not require any more insulin, and 14 (cases 8, 13, 21, 27, 31, 34, 39, 44, 47, 52, 56, 64, 68, and 73) showed slight irregular glycosuria on some days and not on others, which could be controlled adequately with 10 units of protamine-zinc insulin. Of these 14 patients 8 (cases 8, 13, 21, 34, 47, 52, 56, and 68) improved subsequently and did not require any insulin by 18 weeks, and the remaining 6 (cases 27, 31, 39, 44, 64, and 73) continued to show irregular glycosuria.

Case 31 agreed to undergo treatment with œstrogen therapy in spite of the risks and was given 25 mg. of stilbœstrol on alternate days for 3 weeks. He became considerably worse, and œstrogen had to be stopped. He was re-treated with diet and insulin for 4 weeks before he could be restored to the original state.

10 patients (cases 5, 6, 38, 43, 59, 60, 75, 76, 77, and 78) who became sugar-free on diet alone (see above) showed considerable increase of carbohydrate tolerance after 20 days' insulin treatment. They acquired an additional reserve of 150–400 calories.

The 6 patients with severe diabetes (cases 10, 18, 23, 50, 61, and 70) initially required 80–120 units of protamine-zinc insulin, but at the end of 6 weeks they could be controlled with 20–40 units. After 18 weeks' treatment they still required about the same or a smaller amount.

All these cases have been followed up on diet alone for from 6 months to 5 years. Because of the cost involved, as already pointed out, it was only possible to do serial glucose-tolerance tests subsequently in 7 patients (cases 1, 24, 44, 48, 68, 79, and 80). In 18–26 months 5 of them (cases 1, 24, 44, 79, and 80) have returned to well within normal and for all purposes are apparently cured. They now take fat more liberally, but it is limited to 50–60 g. daily. The remaining 2 patients (cases 48 and 68) have

TABLE III—VARIATIONS IN GLUCOSE TOLERANCE ASSOCIATED WITH INTAKE OF FAT

| Date | Blood-sugar (mg. per 100 ml.) | | | | | |
|---|---|---|---|---|---|---|
| | Fasting | After 50 g. of glucose | | | | |
| | | ½ hr. | 1 hr. | 1½ hr. | 2 hr. | 2½ hr. |
| Oct. 10, 1949 | 520 | Not done, patient had severe ketosis | | | | |
| | | After very low-fat diet | | | | |
| Dec. 18, 1949 | 114 | 172 | 212 | 208 | 180 | .. |
| Feb. 9, 1950 | 100 | 140 | 180 | 160 | 150 | 90 |
| March 9, 1950 | 110 | 165 | 190 | 150 | 125 | 80 |
| April 10, 1950 | 112 | 175 | 180 | 170 | 150 | 100 |
| June 17, 1950 | 96 | 140 | 165 | 140 | 95 | 80 |
| July 7, 1950 | 86 | 115 | 145 | 120 | 80 | 85 |
| Aug. 9, 1950 | 90 | 105 | 130 | 95 | 90 | .. |
| | | After indiscretion with fats | | | | |
| Sept. 9, 1951 | 160 | 380 | 280 | 250 | 200 | .. |
| | | After reversion to very low-fat diet | | | | |
| Sept. 29, 1951 | 115 | 220 | 260 | 240 | 160 | 112 |
| Sept. 23, 1951 | 67 | 120 | 137 | 129 | 101 | 75 |
| | | With 50–60 g. of fat | | | | |
| April 28, 1952 | 78 | 153 | 167 | 172 | 166 | 141 |
| May 5, 1952 | 88 | 170 | 177 | 167 | 101 | 76 |

TABLE IV—VARIATIONS IN GLUCOSE-TOLERANCE CURVES

| Date | Blood-sugar (mg. per 100 ml.) | | | | | |
|---|---|---|---|---|---|---|
| | Fasting | After 50 g. of glucose | | | | |
| | | ½ hr. | 1 hr. | 1½ hr. | 2 hr. | 2½ hr. |
| Oct. 10, 1952 | 435 | Not done, patient had severe ketosis | | | | |
| Dec. 23, 1952 | 140 | Not done, patient had myocardial infarction | | | | |
| Jan. 8, 1953 | 167 | Ditto | | | | |
| Feb. 27, 1953 | 168 | 177 | 204 | 209 | 190 | 157 |
| April 17, 1953 | 110 | 149 | 164 | 188 | 167 | 160 |
| May 15, 1953 | 134 | 168 | 195 | 187 | 162 | 111 |
| July 7, 1953 | 130 | 184 | 185 | 151 | 106 | .. |
| Sept. 12, 1953 | 123 | 189 | 174 | 146 | 90 | .. |
| Oct. 3, 1953 | 110 | 202 | 165 | 155 | 109 | .. |
| Nov. 18, 1953 | 121 | 184 | 167 | 123 | 106 | .. |
| Dec. 12, 1953 | 123 | 189 | 169 | 129 | 97 | .. |
| Feb. 6, 1954 | 126 | 172 | 207 | 172 | 138 | 92 |
| April 17, 1954 | 121 | 186 | 166 | 135 | 77 | .. |
| May 15, 1954 | 116 | 184 | 174 | 148 | 102 | .. |
| July 9, 1954 | 111 | 192 | 173 | 153 | 119 | .. |
| Aug. 6, 1954 | 103 | 180 | 165 | 146 | 113 | .. |

glucose-tolerance curves suggesting very mild diabetes. The results obtained in these 7 cases are summarised in table II.

In addition there is an interesting 8th case, a woman now aged 37, whose initial records have been lost. In December, 1950, she required initially 20 units of protamine-zinc insulin. After 8 weeks' treatment she required none. After nearly 4 years of continuous low-fat diet she has turned up with hypoglycæmic symptoms and a glucose-tolerance curve of fasting 59, 1/2 hr. 71, 1 hr. 90, 1 1/2 hr. 110, 2 hr. 88, and 2 1/2 hr. 70 mg. per 100 ml.

The results in these 8 cases are significant. In the last case with hypoglycæmic symptoms it appears that the diabetic tendency has been lost. There is evidence from records of case 80 (table III) that, unless the low-fat diet is kept up for a long time, the diabetic tendency reappears; but it can be recontrolled.

The glucose-tolerance curves undergo the following changes of improvement: (1) lowered fasting sugar, (2) reduced hyperglycæmia with delayed fall, (3) moderate hyperglycæmic reactions, and (4) within normal curves. These changes may be more or less progressive (table III) or may show slight variations from time to time (table IV).

With the return of glucose tolerance to normal in the long run there was a concomitant fall in blood-cholesterol level.

With improvements in symptoms, the glycosuric condition, and general health in a short space of 3–6 weeks, most patients did not mind the comparatively slight inconvenience of adjusting themselves to the low-fat diet and were fully coöperative.

### Summary

80 patients with insulin-sensitive diabetes were treated with low-fat optimal caloric diets containing 20–30 g. of fat, 120–150 g. of protein, and the rest carbohydrate and progressively diminishing therapeutic doses of insulin.

50 of them became sugar-free in 3–6 weeks, and 8 in 18 weeks, and did not need any more insulin. 6 needed 10 units of insulin daily, and in 6 cases the original requirement of 80–120 units was reduced to 20–40 units.

7 cases were checked with serial glucose-tolerance tests for 18–26 months. 5 of them showed return to normal, and 2 to almost normal. Another case in which hypoglycæmia developed, is described.

10 patients who had become sugar-free on diet alone showed increased carbohydrate tolerance.

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"... The most obvious characteristic of present-day standards is their tentative and uncertain nature, and the degree of variation observable within quite small groups in the population. The 'official' mores to which the individual might turn for guidance are far from clear in relation to such matters as marriage, divorce, sex relations, and parenthood, and the various sources of authority differ greatly among themselves. ... The modern individual finds himself in a painful dilemma. On the one hand he feels himself to be under no very rational compulsion to obey any one set of rules or observe any particular customs. On the other hand he is not convinced that these rules and customs have no validity and, especially if he finds himself in trouble, is likely to feel at least some guilt for having infringed them. He is at once unwilling to accept external rules and unhappy over the consequences of accepting responsibility for his own decisions."—Social Casework in Marital Problems. FAMILY DISCUSSION BUREAU. London: Tavistock Publications. 1955; p. 164

# MYLERAN IN CHRONIC MYELOID LEUKÆMIA

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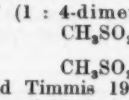
'Myleran' (1 : 4-dimethanesulphonyloxybutane)



(Haddow and Timmis 1953) is an effective palliative in chronic myeloid leukæmia (Galton 1953a and b, Bollag 1953, Hansen 1954, Turesson 1953, Wilkinson 1953, Petrakis et al. 1954). In its ability to relieve symptoms, to reduce the size of spleen and liver, and to improve the blood picture, particularly the hæmoglobin level, it compares well with radiotherapy, and has the advantages of ease of administration and freedom from side-effects. Myleran is ineffective in acute leukæmias and in chronic myeloid leukæmia in myeloblastic relapse. Previous reports have described short-term observations. We now record the effects of repeated courses of myleran and of maintenance therapy in chronic myeloid leukæmia.

### Clinical Material

The trial was started in September, 1950. 31 patients, including the 19 already reported (Galton 1953a), had begun treatment by March, 1954. Table I and fig. 1

TABLE I—METHODS OF ADMINISTRATION OF MYLERAN IN 31 PATIENTS WITH CHRONIC MYELOID LEUKÆMIA

| — | Courses of myleran only | Maintenance therapy after one or more courses | Maintenance therapy only | Total |
|---|---|---|---|---|
| Myleran only .. .. | 5 (1*) | 2 (1*) | 5 | 12 |
| Previous X rays, $^{32}P$ or drugs other than myleran .. .. | 9 (4*) | 4 (2*) | 6 | 19 |
| Total .. .. .. | 14 | 6 | 11 | 31 |

* More than 1 course.

show the types of myleran therapy used in new patients and in those previously treated by X rays, urethane, nitrogen mustard, or $^{32}P$.

### Dosage

Administration is by tablets of 2 mg. and 0·5 mg. In August, 1951, we gave up the "short intensive" courses of treatment in which 100–150 mg. was given in 1–6 days, because severe bone-marrow depression, fatal in 1 case, occurred in 3 patients. The standard dose for adults has since been 0·06 mg. per kg. of body-weight daily (about 4 mg.). An initial loading dose of 20 mg. was used a few times (fig. 4) but was found unnecessary. The first 20 patients received one or more courses of myleran. 8 died within a year of the only course, 7 having received "short intensive" therapy. 11 patients received 1–3 subsequent courses (0·06 mg. per kg. of body-weight daily); maintenance therapy (0·5–4·0 mg. daily) was eventually given to 6 of them. In 11 other patients maintenance therapy was given immediately after an initial period on standard dosage.

### Interrupted Therapy

Treatment was stopped when the clinical and hæmatological improvement seemed to justify it, or when the leucocyte-count was thought to be falling too steeply,

which usually happened when dosage was excessive or was not adjusted according to the rate of fall. With 0·06 mg. per kg. of body-weight daily the treatment lasted 3–7 months. Subsequent treatment was deferred until symptoms returned; the leucocyte-count often rose before this, and the high Hb levels reached were rarely maintained after 6 months, but in the absence of symptoms these were not regarded as indications for resumption of treatment. Symptoms reappeared 5–18 months later. One patient remained well for 3 years after the only course of treatment and then symptoms and signs insidiously appeared which were indistinguishable from those of polycythæmia vera (Galton 1953a, case 5).

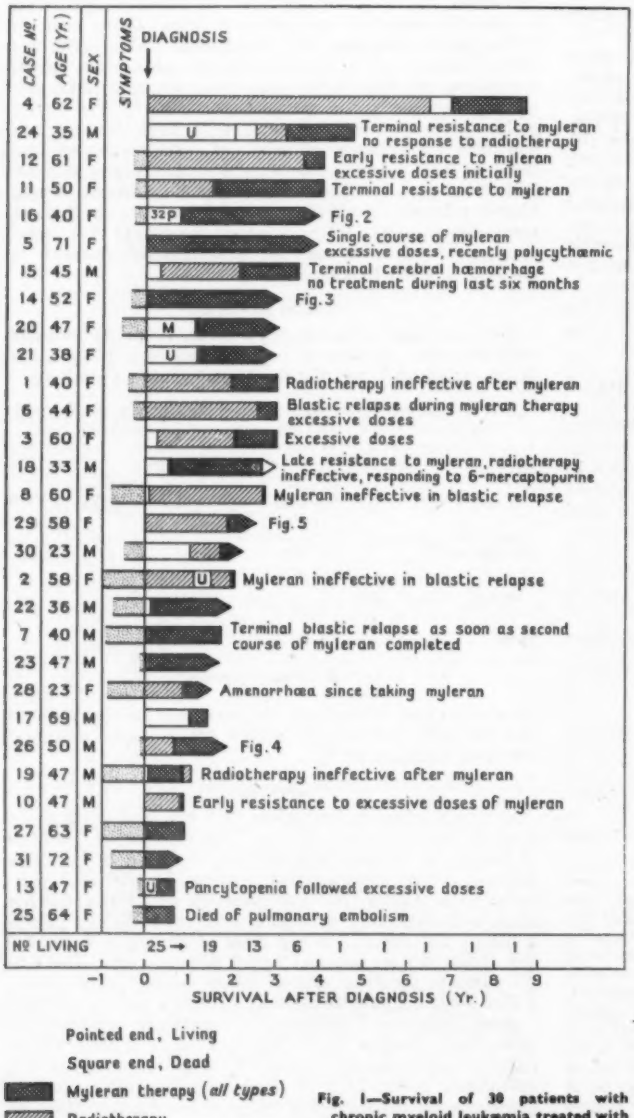

CASE Nº
AGE (Yr.)
SEX
SYMPTOMS
DIAGNOSIS
4 62 F
24 35 M U Terminal resistance to myleran no response to radiotherapy
12 61 F Early resistance to myleran excessive doses initially
11 50 F Terminal resistance to myleran
16 40 F 32P Fig. 2
5 71 F Single course of myleran excessive doses, recently polycythæmic
15 45 M Terminal cerebral hæmorrhage no treatment during last six months
14 52 F Fig. 3
20 47 F M
21 38 F U
1 40 F Radiotherapy ineffective after myleran
6 44 F Blastic relapse during myleran therapy excessive doses
3 60 F Excessive doses
18 33 M Late resistance to myleran, radiotherapy ineffective, responding to 6-mercaptopurine
8 60 F Myleran ineffective in blastic relapse
29 58 F Fig. 5
30 23 M
2 58 F U Myleran ineffective in blastic relapse
22 36 M
7 40 M Terminal blastic relapse as soon as second course of myleran completed
23 47 M
28 23 F Amenorrhœa since taking myleran
17 69 M
26 50 M Fig. 4
19 47 M Radiotherapy ineffective after myleran
10 47 M Early resistance to excessive doses of myleran
27 63 F
31 72 F
13 47 F U Pancytopenia followed excessive doses
25 64 F Died of pulmonary embolism
Nº LIVING 25→ 19 13 6 1 1 1 1 1
−1 0 1 2 3 4 5 6 7 8 9
SURVIVAL AFTER DIAGNOSIS (Yr.)
Pointed end, Living
Square end, Dead
Myleran therapy (all types)
Radiotherapy
No treatment
32P Radioactive phosphorus
U Urethane
M Nitrogen mustard

**Fig. 1—Survival of 30 patients with chronic myeloid leukæmia treated with myleran for 4 years (1 case of subacute leukæmia omitted).**

### Maintenance Therapy

Remissions following second and third courses of myleran were usually shorter, none exceeding 1 year (fig. 2). After completion of treatment the leucocyte-count rose more rapidly and heralded a quicker fall of Hb level and return of symptoms. In 6 patients, therefore, the next clinical relapse was treated by attempting to reduce the leucocyte-count to 10,000–20,000 per c.mm. and to maintain this with appropriate doses of myleran. 11 more patients who had not had myleran previously were also treated thus. Treatment was begun with 0·06 mg. per kg. of body-weight daily, and the dose was later halved. Adjustments of 0·5 mg. daily were made at intervals according to the leucocyte-count.

### Regulation of Dosage

At each outpatient attendance the Hb level, platelet and total leucocyte-counts, and absolute numbers of total immature myeloid cells * were plotted. The top third of the chart is printed in cm. and mm. squares for Hb, the rest being 4-cycle semilogarithmic paper for the platelet and leucocyte counts, which rise and fall approximately logarithmically. A 50% fall in leucocyte-count reflects the same myleran activity whether the initial count is 40,000 or 400,000 per c.mm. On the semi-logarithmic chart the falls are parallel, but on squared paper they look flatter and might lead to unnecessary reduction of the dose of myleran. Conversely, similar rising counts may not receive the attention they merit.

The doses required for maintenance varied from patient to patient, and in the same patient at different times. The smallest maintenance dose used was 0·5 mg. daily and the largest 6 mg. daily (0·065 mg. per kg. of body-weight). No patient has yet received continuous therapy for longer than 23 months, but the development of specific resistance to myleran in 3 patients suggests that it will not be effective indefinitely.

### Results

The general impression already reported has been amply confirmed. Symptoms were rapidly relieved; the Hb level rose steadily; splenic regression, though somewhat slower than with radiotherapy, was equal in extent; and absolute and differential leucocyte-counts approached normal. There were no side-effects, and thrombocytopenia, formerly thought to be an occasional hazard with therapeutic dosage, developed only once since doses exceeding 0·06 mg. per kg. of body-weight daily have been avoided. The immediate response to second courses was similar to the first response, but the subsequent relapse came on earlier.

**Case 16** (fig. 2).—A married woman, aged 40, complained of lassitude, tiredness, and abdominal discomfort for several months. Her spleen was moderately enlarged, and a blood-count on Oct. 26, 1950, showed leucocytes 105,000 (neutrophils 56,000, immature myeloid cells, 24,000) per c.mm. $^{32}$P 3·5 mC given on Dec. 11, 1950, produced some improvement. Symptoms returned in July, 1951; the spleen was again large, and on Sept. 14, 1951, a blood-count showed Hb 82%, leucocytes 125,000 (neutrophils 52,000, immature myeloid cells 58,000) per c.mm., and platelets 180,000 per c.mm.

*Treatment and Progress.*—Myleran 6 mg. daily was given from Sept. 19 to Nov. 30, 1951, total 420 mg. in 70 days. Symptoms disappeared, the spleen became impalpable, the

* Immature myeloid cells include metamyelocytes and earlier forms.

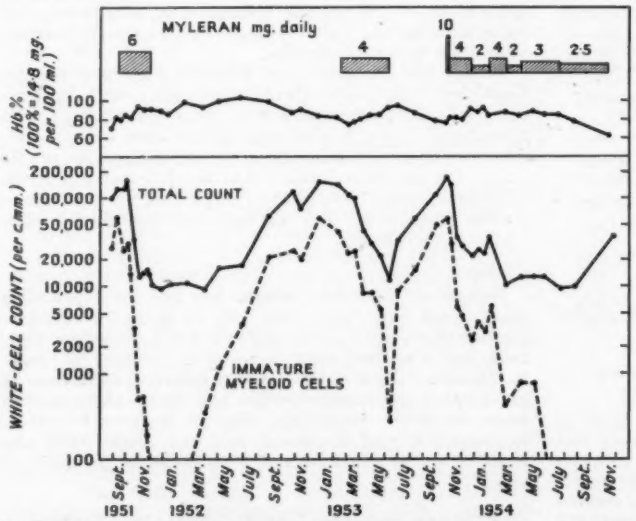



**Fig. 2—Blood-counts in case 16; a patient treated with two courses of myleran and later with maintenance therapy.**

patient remained well. On Feb. 20, 1952, a blood-count showed Hb 98%, leucocytes 10,600 per c.mm. (no immature cells) and platelets 180,000 per c.mm. The patient relapsed in December, 1952. A second course of myleran 4 mg. daily was given from Feb. 12 to June 10, 1953 (total 456 mg. in 114 days), with the same result. A blood-count on June 10, 1954, showed Hb 92%, and leucocytes 11,500 (neutrophils 6400, immature myeloid cells 280) per c.mm. By Oct. 28, 1953, symptoms had returned, the spleen was palpable at the level of the umbilicus, and a blood-count showed Hb 75%, and leucocytes 170,000 (neutrophils 84,000, immature myeloid cells 56,000) per c.mm. Myleran 10 mg. daily was given for 1 week, 4 mg. daily for 7 weeks, 2 mg. daily for 10 weeks, 4 mg. daily for 4 weeks, 2 mg. daily for 4 weeks and 3 mg. daily for 14 weeks. On July 28, 1954, the patient was well, her spleen was just palpable on inspiration, and a blood-count showed Hb 82%, leucocytes 9000 per c.mm. (no immature cells), and platelets 330,000 per c.mm. The dose was reduced to 2·5 mg. daily. In October, 1954, myeloblastic relapse supervened.

This patient had relapsed 4 months after completing her second course of myleran, but remained well on maintenance therapy for a year.

**Case 14** (fig. 3, table II).—A married woman, aged 52, complained of malaise, weakness, and tiredness since March, 1951. In June she had pain over the left lower ribs for 3 weeks. In July her spleen was found to be firm and moderately enlarged, and a blood-count on Aug. 2, 1951, showed Hb 76%, leucocytes 150,000 (neutrophils 99,300, immature myeloid cells 41,400) per c.mm., and platelets 360,000 per c.mm.

*Treatment and Progress.*—Myleran 150 mg. was given on Aug. 3, 1951; 50 mg. on Aug. 26 and 27, 8 mg. daily from Aug. 28 to Sept. 25; 10 mg. daily from Sept. 26 to Sept. 29; and 4 mg. daily from Sept. 30 to Oct. 2, 1951. On Nov. 6 the patient was well, her spleen was impalpable, and a blood-count showed Hb 118% and leucocytes 18,000 (neutrophils 14,000, immature myeloid cells 880) per c.mm. She remained well till January, 1953, when all symptoms had returned and the spleen was palpable at the level of the umbilicus. On Jan. 12, 1953, a blood-count showed Hb 68% and leucoctyes 290,000 (neutrophils 125,000, immature myeloid cells 105,000) per c.mm. The patient was given myleran 4 mg. daily from Jan. 13. Subsequent adjustments of dosage and their effects on the leucocyte-count are shown in table II. The patient was last seen on Oct. 26, 1954, in good health. Her spleen was just palpable on deep inspiration, and a blood-count showed Hb 91% and leucocytes 13,300 (immature myeloid cells 2400) per c.mm.

This patient has enjoyed excellent health on continuous therapy. In cases 14 and 16 the spleen did not extend below the level of the umbilicus before the initial treatment, and became impalpable or only just palpable with each course of myleran; grossly enlarged spleens usually regressed less with each subsequent course.

### HÆMATOLOGICAL CHANGES

*Leucocytes*

Under treatment with myleran 0·06 mg. per kg. of body-weight daily the leucocyte-count was approximately halved monthly. In 4 cases administration had to be stopped because the count was allowed to fall too low (5000–6000 per c.mm.). No harm resulted, and the counts rose. No serious leucopenia developed with doses of 0·06 mg. per kg. of body-weight or less. The subsequent trend of the leucocyte-count varied in patients whose treatment was stopped when the clinical and hæmatological condition was at its best. In 1 case the leucocyte-count and differential count remain normal after nearly 4 years (Galton 1953a, case 5). Most patients after their first course of myleran, whether or not they had been treated previously by other means, showed a slow but steady increase in their total leucocyte-counts, and immature leucocytes had usually reappeared in the blood within 6 months. In most but not all of these

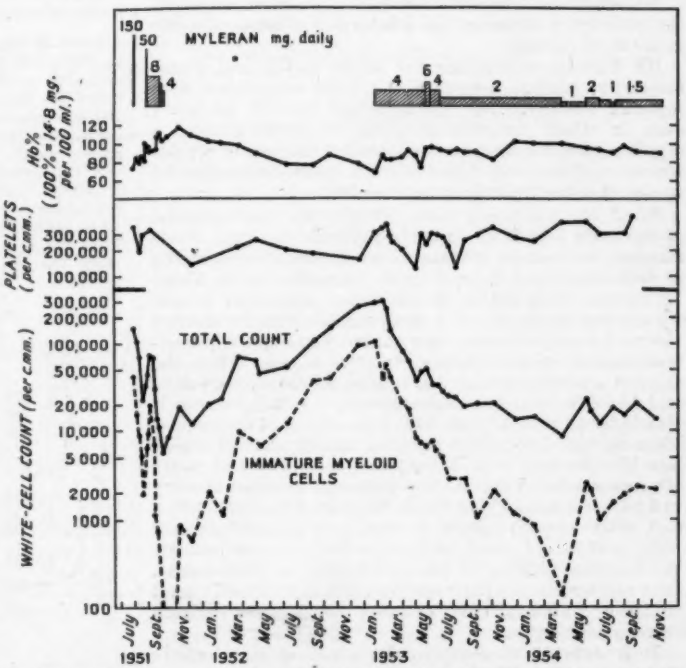



**Fig. 3—Blood-counts in case 14; a patient treated with one course of myleran and later with maintenance therapy.**

TABLE II—CONTINUOUS MYLERAN THERAPY IN CASE 14 WITH CHRONIC MYELOID LEUKÆMIA, SHOWING ADJUSTMENTS OF MAINTENANCE DOSE WITH CHANGING LEUCOCYTE-COUNT

| Period | Dose of myleran (mg.) | | Leucocyte-count per c.mm. | |
|---|---|---|---|---|
| | Daily | Total | Initial | Final |
| Jan. 13–June 30, 1953 (169 days) | 4 | 676 | 300,000 | 28,500 |
| July 1, 1953–March 9, 1954 (252 days) | 2 | 504 | 28,500 | 8800 |
| March 10–May 4, 1954 (56 days) | 1 | 56 | 8800 | 24,000 |
| May 5–June 1, 1954 (28 days) | 2 | 56 | 24,000 | 12,400 |
| June 2–November, 1954 (continuing) | 1·5 | 228 + | 12,400 | 13,300 Oct. 26,1954 |

patients immature leucocytes had disappeared from the blood by the end of the course.

The leucocyte-counts of patients treated with myleran for the second or third time fell as rapidly as they had before but the absolute number of immature leucocytes usually remained higher. Soon after the end of the course the total leucocyte-count rose. In some patients treated for the first time with myleran the leucocyte-counts fell slowly and the numbers of immature leucocytes remained relatively high. In these patients also the leucocyte-count rose quickly when treatment was stopped. In both groups maintenance therapy was attempted. The behaviour of the leucocyte-count under maintenance therapy was closely related to the dose of myleran (figs. 2 and 3, table II). When Hb increase was satisfactory we did not try to lower the leucocyte-count further. In cases 24 and 29 it remained between 50,000 and 60,000 per c.mm. for 6–18 months.

Throughout the illness the absolute immature myeloid-cell count remained high when the spleen remained large, and fell as the spleen regressed.

*Hæmoglobin*

Although the leucocyte-count is a sensitive index to the activity of myleran, the Hb level is a more valuable guide to its efficacy.

Hb increase continuing for 12–20 weeks and maintained for various periods is a regular occurrence with myleran therapy. The Hb level has risen in all but 1 case, in which transfusions given elsewhere masked a possible spontaneous increase (case 31), 2 cases of myeloblastic relapse (cases 2 and 8), and 1 case now regarded as one of subacute leukæmia (case 10).

In all the remaining cases Hb increase has been one of the main beneficial effects of myleran therapy. Some increase was usually evident a month after the beginning of treatment, and normal levels were reached in about 12 weeks. The Hb level sometimes continued to rise for another 2 months. The most anæmic patients showed the most rapid increase. One patient had required blood-transfusions every 6 weeks for over a year before the start of myleran therapy but needed no more afterwards, and the Hb level rose subsequently to 85%, where it stayed for 18 months (case 24). Patients who had relapsed after an initial course of myleran usually showed rather less Hb increase with subsequent courses. The mean Hb increase following the first course of myleran therapy in 6 patients was 45% in 106 days (max. 66%, min. 18%), and after second courses in the same 6 patients was 29% in 113 days (max. 46%, min. 20%). In 10 patients the daily rise of Hb level was 0·40–0·62% for 12–20 weeks. In 2 radio-resistant patients (figs. 4 and 5) the Hb level continued to fall for 6 weeks and 4 months after myleran therapy was begun.

It is difficult to compare the effect of maintenance therapy on the Hb with that of an initial course of myleran, since maintenance therapy was usually started late in the course of the disease, but satisfactory Hb levels were maintained for long periods, in case 14 between 80 and 120% for 23 months.

Rapid Hb increase was usually, but not always, associated with rapid splenic regression; with myleran therapy splenic regression was often slower than with radiotherapy, yet the rate of Hb increase was similar; reticulocyte crises sometimes heralded the rise of Hb level. We therefore believe that the Hb increase is real and not an artefact resulting from falling plasma volume (Berlin et al. 1950) but we have not determined total-erythrocyte-volumes.

*Platelets*

Dangerous thrombocytopenia has not developed since small doses have been used. Of 14 cases 7 showed no significant changes in the platelet-count, 3 showed slight falls, and 4 showed slight increase in the first 12 weeks' treatment. Only 1 of the patients (Galton 1953a, case 11) on continuous therapy, who had been thrombocytopenic from the beginning, showed temporary platelet depression during treatment, and this might have been avoided had a platelet-count been made at the previous visit.

## MYLERAN AND THE "RADIO-RESISTANT" PATIENT

It is always difficult to claim that a drug is effective in the radio-resistant case, because "radio-resistance" has several meanings. Several patients were referred for myleran therapy because radiotherapy had been abandoned or not even tried. The reasons given included anæmia, poor general condition, and thrombocytopenia; and in 1 case the presence of 8% myeloblasts had led to a diagnosis of acute leukæmia. These patients, gravely ill and thought to be beyond treatment, responded well to myleran but might have responded equally well to properly administered radiotherapy. In other patients remissions induced by X rays were becoming short-lived or were short-lived from the beginning. In these patients myleran produced benefit that radiotherapy could not offer. In this sense, myleran is effective in the radio-resistant case.

**Case 26** (fig. 4).—A man, aged 50, complained of tiredness and irritability at work since December, 1952. On examination (Dr. N. Sacks) his spleen was just palpable. A blood-count on March 25, 1953, showed Hb 65% and leucocytes 193,000 (neutrophils 82,000, immature myeloid cells 58,000) per c.mm. Radiotherapy to the spleen was followed by rapid improvement, but by August, 1953, symptoms had recurred and the blood picture was the same as before treatment. A second course of radiotherapy was given in August and September, 1953, with good results. On Oct. 1, 1953, a blood-count showed Hb 88% and leucocytes 8800 (neutrophils 6200, immature myeloid cells 430) per c.mm.; but on Nov. 10, 1953, the leucocytes numbered 68,000 (neutrophils 37,000,

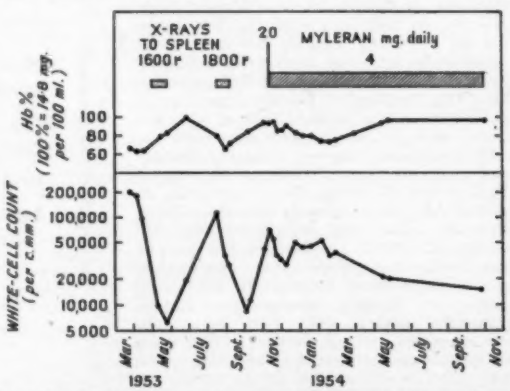



Fig. 4—Blood-counts in case 26; a patient treated with continuous myleran therapy after two courses of radiotherapy.

immature myeloid cells 23,000) per c.mm. The spleen was just palpable, but there were no other relevant physical signs and no symptoms.

*Treatment.*—Myleran 20 mg. was given on Nov. 3, 1953, and from Nov. 4 onwards he has been taking 4 mg. daily. His health has remained good and he has been able to travel extensively in connection with his work. In November, 1954, a blood-count showed Hb 94% and leucocytes 16,100 (2400 immature myeloid cells) per c.mm.

This was the only case in the series in which myleran therapy was begun in the absence of symptoms; but increase in leucocytes from 8800 to 68,000 per c.mm. in 6 weeks suggested that clinical relapse was impending. The patient is well after a year on continuous myleran therapy.

**Case 29** (fig. 5).—A widow, aged 58, complained of failing eyesight, failing memory, loss of weight, thirst, polyuria, and deafness since December, 1951. At another hospital she was found to be diabetic and hypertensive (blood-pressure 210/110 mm. Hg), and her spleen and liver moderately enlarged. A leucocyte-count in March, 1952, was 53,900 per c.mm. (immature myeloid cells 30%). Her symptoms were relieved by radiotherapy, a diet, and insulin. In January, 1953, she felt extremely ill, her spleen and liver were again enlarged, and a blood-count on Jan. 6, 1953, showed Hb 72% and leucocytes 144,500 (immature myeloid cells 55,000) per c.mm.

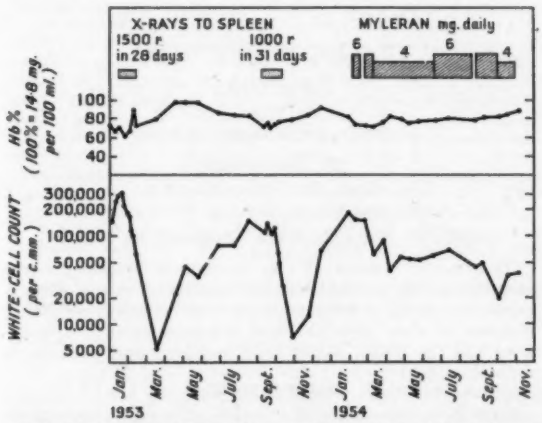



**Fig. 5—Blood-counts in case 29; a patient treated with continuous myleran therapy after three courses of radiotherapy (first course not charted).**

Radiotherapy to the spleen was followed by improvement, but in September, 1953, another course was necessary. On Dec. 10 the Hb was 92%. In January, 1954, the spleen was increasing in size and giving rise to pain, the Hb level was falling, and the leucocyte-count was rising. A blood-count on Feb. 1, 1954, showed Hb 81% and leucocytes 180,000 (immature myeloid cells 52,000) per c.mm.

*Treatment.*—Myleran 6 mg. daily (0·065 mg. per kg. of body-weight) was given from Feb. 2 to Feb. 16, 1954, and from Feb. 24 to March 10; 4 mg. daily from March 11 to June 15; and 6 mg. daily from June 16 onwards. The patient's condition improved, and apart from an attack of bronchitis in May and intermittent diabetic symptoms she has remained well. Her spleen regressed 7 cm. After myleran therapy was begun, the Hb level continued to fall for 6 weeks. On March 10 it was 72%. On Nov. 2, 1954, a blood-count showed Hb 87% and leucocytes 39,000 per c.mm.

Remissions following radiotherapy were short-lived, particularly the last; on myleran the patient has been well for nearly a year, and the blood picture is still slowly improving. In cases 26 and 29 the slow rate of fall of leucocyte-count and the delay before the Hb level began to rise should be noted.

### RESISTANCE TO MYLERAN

After large doses of myleran 3 patients became rapidly resistant to further treatment with myleran (Galton 1953a). With the small doses since used this has not occurred; but 3 patients with relatively stable blood pictures during continuous therapy for over a year showed slowly progressive splenic enlargement, which gave rise to pain and distension in 2 cases. Myleran was withheld, and radiotherapy to the spleen was given with little effect. One patient responded for a time to 6-mercaptopurine; the other 2 died. At necropsy extensive leukæmic infiltration was found. Thus resistance to myleran, possibly specific, eventually develops and may limit the period of useful therapeutic response. Two other patients entered the terminal phase while on continuous therapy. Their spleens were only slightly enlarged, and the first indication of relapse was a falling Hb level and a rising leucocyte-count. W. Bollag (personal communication) obtained a response to methylcolchicine in a similar case; a further short course of myleran was ineffective, but a second response to methylcolchicine ensued.

### Interrupted and Maintenance Therapy Compared

The *advantages of interrupted therapy* are as follows:

(1) Smaller quantities of myleran are required.
(2) The patient feels that something positive has been achieved when his treatment ends and he continues well for a year or more.

The *disadvantages of interrupted therapy* are as follows:

(1) The high Hb levels reached are not usually maintained. After about 6 months an insidious fall begins, leading imperceptibly to loss of fitness and efficiency before the return of definite symptoms.
(2) Remissions are shorter with each successive course.
(3) Patients with rapidly progressive leukæmia may relapse quickly when myleran is withheld.

The *advantages of maintenance therapy* are as follows:

(1) High Hb levels are maintained for long periods.
(2) Good general health and high working efficiency are maintained.
(3) Maintenance therapy is often successful after the remissions following interrupted courses have become short-lived, or in patients with rapidly progressive leukæmia who relapse quickly after a completed course.

The *disadvantages of maintenance therapy* are as follows:

(1) The patient realises that he is still not normal.
(2) Resistance to myleran is eventually acquired.

Bone-marrow failure as a result of long-continued administration of myleran was our chief apprehension when we began maintenance therapy, but it has not appeared.

### Routine Use of Myleran

Most patients can be treated as outpatients from their first visit. Monthly attendance is sufficient when not more than 0·06 mg. per kg. of body-weight daily is given; but, to observe the effect of stopping treatment or of reducing the dose, two or three fortnightly visits may be necessary. At each attendance the patient is weighed and examined; skin and mucosæ are inspected for evidence of hæmorrhage, and the sizes of spleen and liver, measured in cm. from fixed reference points, are recorded. Before therapy is begun, the Hb level, total and differential leucocyte-counts, and platelet-count (by a wet method) are determined. At subsequent visits the Hb level and total leucocyte-counts are plotted on a graph (see above) before further myleran is prescribed. Platelet-counts and differential leucocyte-counts are not essential if a stained blood-film is examined, provided that the initial platelet-count is not below 200,000 or above 800,000 per c.mm. When the platelet-count is 800,000 per c.mm. or higher, we advocate treatment even in the absence of symptoms. Both our patients whose platelet-counts exceeded 1,000,000 per c.mm. developed persistent priapism.

The clinical response to myleran usually precedes improvement in the blood picture; but, even when the response is delayed and the Hb level continues to fall, it is worth persisting with treatment at the same dosage for as long as 4 months (case 26, fig. 4 and case 29, fig. 5).

### Discussion

In assessing the place of myleran in the management of chronic myeloid leukæmia we must ask first if it is an effective substitute for the best available treatment, radiotherapy (including the use of radioactive phosphorus); secondly, if it is effective when radiotherapy has failed; and thirdly, how it compares with other chemotherapeutic agents.

Only 11 patients have been treated with myleran alone, 7 of whom are still living; only 2 have been observed for more than 3 years from diagnosis, which is about the median survival from diagnosis in patients treated by external radiation and with radioactive phosphorus (Lawrence 1954). It is therefore too early to compare the survival-rates of patients treated with myleran alone with those treated by radiotherapy alone. Thus, until statistical analysis becomes practicable, we cannot advocate myleran as a first line of treatment, although at present it appears to be a satisfactory substitute for radiotherapy and can justifiably be used as such if radiotherapy is unavailable, impracticable, or contra-indicated. The absence of side-effects, though an advantage over external radiotherapy, is also the main advantage of radioactive phosphorus (Lawrence 1954). We are on more certain ground in considering patients who have responded badly to radiotherapy from the start or whose remissions have become progressively shorter. These have responded well to myleran, and one might reasonably expect to prolong life.

Myleran is superior to urethane, benzene, and arsenic because there are no side-effects, response is less erratic, and the remissions are longer. We have not used triethylene melamine (2 : 4 : 6-tris-ethylene-imino-1 : 3 : 5-*s* triazine) in chronic myeloid leukæmia, but usually the published results that are counted as successes seem poor by the standards we have become accustomed to since myleran became available (Bond et al. 1953).

Concerning methods of using myleran, there are advantages and disadvantages of both interrupted courses and of continuous therapy. Interrupted courses are often successful at first, but some patients, particularly those who relapse rapidly after radiotherapy, require maintenance therapy after the first course, and most patients require it after the second. Resistance to myleran apparently specific, has developed during the second year of continuous therapy in 3 cases. It is still too early to say whether continuous therapy should be deferred on this account until interrupted therapy has been tried first.

### Summary

In a 4-year trial 31 patients with chronic myeloid leukæmia were treated with myleran.

Successive courses and continuous maintenance therapy were used.

Re-treatment after courses was deferred until symptoms returned.

Remissions following subsequent courses were shorter than after the first.

Patients on maintenance therapy were kept well for periods up to 2 years, but resistance, apparently specific, appeared in 3 cases.

Although, on limited experience, myleran is a satisfactory substitute for radiotherapy, its chief advantage is its efficacy when radiotherapy has been of limited value or has ceased to be effective.

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## POSTOPERATIVE MEMBRANOUS TRACHEOBRONCHITIS

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TRAUMATIC lesions of the trachea following general anæsthesia by intubation are relatively rare. The 4 cases considered here were felt by us to be worth recording because of their clear-cut and dramatic clinical appearance and the doubt about their æ.iology and pathology.

### Case-reports

**Case 1.**—A woman, aged 21, with pulmonary tuberculosis and cavitation in the left upper lobe, underwent left upper lobectomy on July 23, 1953, from which she recovered uneventfully. On Aug. 20, 1953, a four-rib corrective thoracoplasty was done. The anæsthesia in both cases was with thiopentone, curare, and nitrous oxide and oxygen through a cuffed endotracheal tube.

Twenty-four hours after the second operation the patient was very dyspnœic, flushed, anxious, and pyrexial (101°F) and had clinical and radiological evidence of collapsed left lower lobe. Bronchoscopy was undertaken under local anæsthesia, and the left main bronchus was found to be obstructed by two cuffs of membranous material each about 1 cm. long. These were removed, and there followed immediate re-aeration of the left lower lobe.

*Pathology.*—The material was mucinous exudate with numerous inflammatory cells enmeshed in it.

**Case 2.**—A woman, aged 32, with pulmonary tuberculosis, was subjected to left upper lobectomy with simultaneous corrective thoracoplasty on Dec. 17, 1953. The anæsthesia was given as in case 1. At routine postoperative bronchoscopy a red œdematous circumferential area was seen at the lower end of the trachea.

Forty-eight hours later the patient was distressed, and her breathing was difficult and noisy; and she was flushed, anxious, and pyrexial (101°F). Bronchoscopy was immediately done under general anæsthesia, and a circumferential cuff of membrane, which was almost obstructing the lumen of the lower end of the trachea, was removed with forceps. Recovery was then uninterrupted.

**Case 3.**—A boy, aged 12 years, was admitted to the thoracic surgical centre as an urgent case on Dec. 29, 1953, with a

retropharyngeal abscess, which had that day been unsuccessfully explored elsewhere under general anæsthesia using a cuffed tube. Stridor and distortion of the trachea had been present before and after this operation, and hurried bronchoscopy had been done at the end of it.

On admission, twenty-four hours later, the trachea was re-examined through the bronchoscope, and, in addition to distortion due to the abscess, a circumferential white slough was seen, 2 inches beyond the larynx, and was thought to coincide with the site of the cuff of the cuffed tube. It was not disturbed, the lumen being adequate.

The abscess was drained through the left side of the neck, and two hours later urgent bronchoscopy was necessitated by severe respiratory obstruction and massive collapse of the right lung. It was found that the tracheal slough had become detached and had occluded the right main bronchus. It was removed, and recovery followed.

**Case 4.**—A boy, aged 9 years, underwent resection of the basal segments of the left lower lobe for bronchiectasis on Sept. 8, 1954. The anæsthetic was generally similar to that used in the previous cases, and a cuffed tube was used.

Next day the boy was very breathless and anxious, his respirations being wheezy and rapid. There was radiological evidence of patchy atelectasis of the right lung. Aeration of the right lung improved with postural drainage and physiotherapy, but on the following day the boy was clearly much worse. He had severe stridor, laboured rapid respirations, pyrexia, and cyanosis.

Bronchoscopy under general anæsthesia showed that the upper part of the trachea immediately below the larynx was almost completely obstructed by a loose circumferential membrane, which on removal was found to be a cylinder 3 cm. long. This produced most satisfactory clinical improvement, and radiography immediately after the bronchoscopy showed re-expansion of the collapsed segments. The clinical improvement was maintained for about twelve hours, and then renewed wheezing and distress for twenty-four hours necessitated further bronchoscopy. The cylindrical membrane had re-formed, and its removal once again brought relief. This happened twice more at intervals of twenty-four hours, but at the fourth and last bronchoscopy the membrane was somewhat thinner. The child's further convalescence was uneventful.

*Pathology.*—The cast consisted of fibrinous material showing a moderate admixture with polymorphs.

### Discussion

It is inviting to suppose that these membranes were sloughs of the mucosa, and that they had been produced by pressure necrosis at the site of the cuff of the endotracheal tube; Muir and Straton (1954) point out that this has been assumed by numerous workers.

Microscopy of the membranes removed in cases 1 and 4 showed no evidence of mucosal elements; and, although we have no evidence of the structure of the membrane in cases 2 and 3, their very close similarity of appearance probably justifies our belief in a similar morphology.

Certainly in case 1 the damage was not produced by pressure, because the membrane was found in the left main bronchus.

Belam and Zuck (1953) seem to suggest that the pressure exerted by the cuff of an endotracheal tube on the mucosa is the same as the pressure required to inflate the cuff. This is clearly not so, because most of this inflationary pressure is expended against the elasticity of the rubber cuff and will vary according to its strength. Muir and Straton (1954) point this out and show experimentally that the pressure applied to the mucosa in the presence of a gastight fit is very small, being only a few centimetres of water and well below the capillary blood-pressure.

On the other hand, it is clearly possible to inflate the cuff unwittingly with much more air than is required merely for a gastight fit, and such indiscriminate inflation may produce a higher pressure on the mucosa. Where hypotension is occasioned either by design or as a result of blood-loss and trauma, the capillary blood-pressure may fall below the pressure of the cuff on the mucosa.

On the whole we feel that in the average case the cuff of the tube does not produce damage by pressure; but it may well be locally traumatic if it moves within the trachea, and perhaps rotatory movements, as when the head is moved from side to side, are especially important.

The membranous tracheobronchitis in each of the present cases has been diagnosed fortuitously by bronchoscopy, which, of necessity, is a common-place postoperative procedure in a thoracic surgical unit.

We wonder how often membranous tracheobronchitis follows endotracheal anæsthesia for major operations on other parts of the body and masquerades as "postoperative chest."

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## POST-PREGNANCY OSTEOPOROSIS

### A SYNDROME?

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GENERALISED rarefaction of the skeleton is usually due to osteomalacia or osteoporosis. In Western Europe, osteomalacia is usually due to steatorrhœa; but in the East, where dietary vitamin D is barely adequate, it is commonly precipitated by the mineral demands of pregnancy and lactation (Snapper 1949). The pathognomonic radiological feature of osteomalacia is the Milkman fracture (or Looser's zone), and the characteristic biochemical changes are a reduction in the product of the serum-calcium and serum-phosphate concentrations and a rise in the serum alkaline phosphatase.

In contrast to osteomalacia, osteoporosis is primarily a disorder of the protein matrix of bone (Albright and Reifenstein 1948). It is not associated with any known disturbance of serum biochemistry, although the serum-phosphate level in large series is said to be in the upper range of normal (Albright and Reifenstein 1948, Donaldson and Nassim 1954). It may occur in malnutrition, thyrotoxicosis, Cushing's syndrome, acromegaly, or scurvy, or it may present without obvious cause. This latter form of osteoporosis is seen more commonly in women than in men, is usually classified arbitrarily into postmenopausal and senile varieties according to the age and sex of the patient, and tends to affect the spine more severely than the rest of the skeleton. On the rare occasions when it afflicts young adults who are otherwise in good health, it is known as idiopathic osteoporosis.

During the past three years we have seen four young married women with backache and compression fractures of one or more vertebræ, all of whom were suffering from idiopathic osteoporosis. Their first symptoms appeared during or shortly after pregnancy, and the purpose of this report is to suggest that the association between the osteoporosis and the pregnancy may not be fortuitous.

### Clinical Histories

**Case 1.**—Mrs. A., a housewife, was admitted in July, 1952, at the age of 28, for investigation of backache and osteoporosis of the spine. She had taken thyroid extract gr. 3 daily for obesity from her 18th to her 24th year. At the age of 22, after an uneventful pregnancy and delivery, she developed lumbar backache and pains in both thighs which became so severe that about 4 months after delivery she was scarcely able to walk. Investigation elsewhere at that time revealed rarefaction of the spine associated with normal

TABLE I—SUMMARY OF HISTORY AND PHYSICAL AND RADIOLOGICAL FINDINGS

| Case | Age (years) and parity at onset | First symptoms | Breast-feeding | Height (in.) | Span (in.) | Weight (lb.) | X rays: Codfish vertebræ | X rays: Vertebral compression | Limb bones normal. No Milkman fractures |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 22 para-1 | Lumbar backache and pain in thighs commenced 2 – 3 months after delivery | All babies breast-fed for at least 3 months | 59 | 64 | 123 | + | D.12 | |
| 2 | 32 para-2 | Lumbar backache commenced 2 months after second delivery | | 59 | 59 | 128 | + | D.6<br>D.8<br>L.1<br>L.2 | |
| 3 | 24 para-3 | Lumbar backache* commenced soon after third delivery | | 62 | 67† | 124 | + | D.12 | |
| 4 | 35 para-2 | Lumbar backache and pain in thighs commenced 3 months after second delivery | | 67 | 71 | 150 | + | L.1<br>L.2<br>L.3 | |

* Apart from a brief episode following trauma in her first pregnancy.
† Estimated from scale photograph.

calcium, phosphate, and alkaline phosphatase levels in the serum. She was given calcium, calciferol, and a plaster cast, and she improved slowly; but she was still troubled by severe backache when she came to Hammersmith Hospital in July, 1952. Her recovery has continued and she is now at work, although the X-ray appearances remain virtually unchanged.

**Case 2.**—Mrs. B., a housewife who had had a normal pregnancy and delivery in 1949, was admitted in January, 1953, at the age of 32, 4 months after her second pregnancy. The pregnancy had been uneventful, but 2 months after it she developed increasingly severe low back pain. Radiography showed spinal osteoporosis with vertebral wedging, and she was admitted for investigation. Her symptoms soon improved spontaneously; but she was given testosterone, œstrogens, and a spinal brace (Fisher type), which was discarded 12 months later. When last seen in June, 1954, she was symptom-free and carrying out her full duties as a housewife.

**Case 3.**—A Persian lady, aged 28, was admitted in August, 1953, for investigation of spinal osteoporosis. There was no relevant family history, and her childhood and menarche had been normal. She first noticed backache in the last month of her first pregnancy in 1947, but this resolved soon after delivery. She had an uneventful second pregnancy and delivery in 1948; but her third pregnancy the following year was complicated by intermittent backache, and soon after delivery she was admitted to hospital in Tehran where the radiological and biochemical findings led to a diagnosis of idiopathic osteoporosis. Her backache improved somewhat under treatment with hormones and calcium injections, but was still present occasionally when she came to London in 1953. She was given a testosterone implant and oral œstrogens and was virtually symptom-free when last seen.

**Case 4.**—Mrs. C., a housewife, aged 35, was first seen in November, 1952, at the West London Hospital, with an 8-week history of severe backache beginning 4 weeks after her second delivery. Her first pregnancy in 1949 had been complicated by toxæmia. She was found to have severe spinal osteoporosis, with "codfish" deformities and vertebral compression, and normal serum biochemistry. In the absence of any other predisposing cause, idiopathic osteoporosis was diagnosed. Spontaneous improvement followed rapidly, but the patient was subsequently given a short course of methyl androstenediol. She is now symptom-free.

The principal data from the case-histories are summarised in table I. All four patients gave a clear history of the onset of symptoms during or just after pregnancy. There was nothing to suggest any of the known causes of osteomalacia or osteoporosis.

### Examination and Investigations

*Physical Findings.*—Abnormal physical findings were confined to limitation of spinal flexion and tenderness of the lower dorsal and upper lumbar spinous processes. Case 1 also had a kyphoscoliosis. The patients presented none of the features of Cushing's syndrome or other endocrine disorder, and they were all well nourished. In three of them the span appreciably exceeded the height, and in one (case 2) span and height were equal (table I).

*Radiographic Appearances.*—In all four cases there was extensive rarefaction of the spine, with biconcave deformities (codfish vertebræ) and crush fractures (fig. 1). The skull, long bones, and hands all appeared normal. There were no Milkman fractures.

*Biochemistry.*—The serum calcium and phosphate levels were normal in all patients at all times. The serum alkaline phosphatase was slightly raised in case 2.

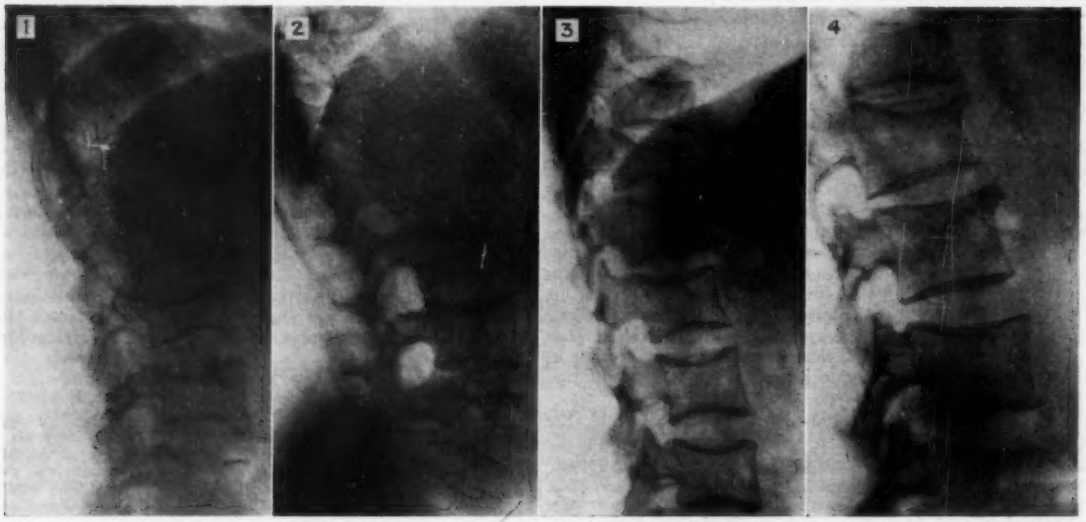


Fig. 1—Lateral views of the vertebral column in the four patients showing "codfish" vertebræ and one or more crush fractures in every case.

TABLE II—PRINCIPAL BIOCHEMICAL FINDINGS

| — | | Serum | | | Urine | | Calcium tolerance test * |
|---|---|---|---|---|---|---|---|
| Case | Period after delivery | Calcium (mg./100 ml.) | Phosphate (mg./100 ml.) | Alkaline phosphatase (K.-A. units/100 ml.) | Calcium on 100 mg./day intake (mg./24 hr.) | Ratio of phosphate to creatinine clearance | 0–12 hours' calcium excretion |
| 1 | 4 years | 9·8, 10·0 | 5·6, 3·4 | 5·5, 6·0 | 140 mg. (mean of 5 days) | 0·13† | .. |
| | 6 years | 10·0 | 2·8 | 6·7 | 75 mg. | 0·16 | 57% |
| 2 | 4 months | 9·9, 10·7 | 4·5, 4·1 | 18, 15·5, 10·0 | 220 mg. (mean of 6 days) | 0·17 | 79% |
| | 18 months | 9·6 | 3·0 | 12·1 | 48 mg. | 0·11 | 81% |
| 3 | 4 years | 10·3 | 4·3 | 11·3 | 73 mg. | 0·13 | 57% |
| 4 | 3 months | 12·6, 11·0 | 3·6, 4·0 | 7·0 | .. | .. | .. |

* Normal range about 40–60%. † Phosphate/inulin clearance.

The ratio of phosphate clearance to inulin or creatinine clearance (Milne et al. 1952) was measured and found to be normal in cases 1, 2, and 3 (table II). In cases 1, 2, and 3 the following additional investigations were made, all with normal results: blood-count, serum albumin and globulin, serum-electrolytes, and urinary 17-ketosteroid excretion.

*Bone Biopsies.*—Bone was taken from the iliac crest in cases 1, 2, and 3 (Sacker and Nordin 1954) (figs. 2 and 3). Osteoporosis (thin, fractured trabeculæ) was present in cases 1 and 2, but in case 3 (4 years post partum) the biopsy specimen appeared normal. No widening of the osteoid seams, characteristic of osteomalacia, was seen in any biopsy.

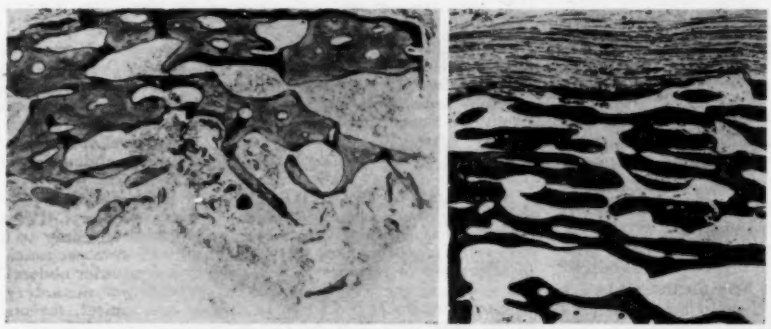

Fig. 2—Bone removed from iliac crest in cases 1 and 2, showing thin fractured trabeculæ with no osteoid seams. (Periosteal surface at the top.) (Picro-malachite × 20.)

*Metabolic Data.*—Fat balances were carried out in cases 1 and 3, and yielded normal results (94% and 97% absorption). In case 4 the fat-content of a single stool sample was reported as 16% of the dry weight—also normal. Urinary calcium excretion on a 100-mg. calcium diet was measured in case 1 (4 years post partum) and case 2 (6 months post partum). The former excreted 140 mg. daily during a 5-day period, the latter 220 mg. daily during a 5-day period; but the figures had fallen below 100 mg. when the patients were seen 2 and 1 years later respectively. In case 3 (4 years post partum) the patient excreted 37 mg. of calcium in the urine on the same low-calcium diet (table II).

*Calcium Infusions.*—Cases 1, 2, and 3 were given standard calcium infusions (Nordin and Fraser). (Normal people excrete in the urine 40–60% of the administered calcium in the 12 hours following the infusion.) In case 2 the excretion 6 months post partum was 79% and a year later 81%. In cases 1 and 3 normal percentages of the dose were excreted 6 and 4 years post partum (table II). These findings are all compatible with a diagnosis of osteoporosis and strongly against one of osteomalacia.

## Discussion

It is tempting to attribute the skeletal rarefaction in these four patients to the increased calcium requirements of pregnancy, and to regard the condition as a form of osteomalacia comparable to that which may be precipitated by pregnancy in Asiatic countries. But there was nothing in the patients' histories to suggest inadequate intake of calcium or vitamin D, and the absence of decalcification and pseudofractures in the limb bones, despite the codfish vertebræ, pointed to a diagnosis of osteoporosis rather than osteomalacia. The normal serum biochemistry and the normal phosphate/inulin and phosphate/creatinine clearance ratios (Milne et al. 1952) were also against a diagnosis of osteomalacia, as were the relatively high urinary calcium excretion in cases 1 and 2 on a low-calcium diet and the results obtained with the calcium-tolerance test.

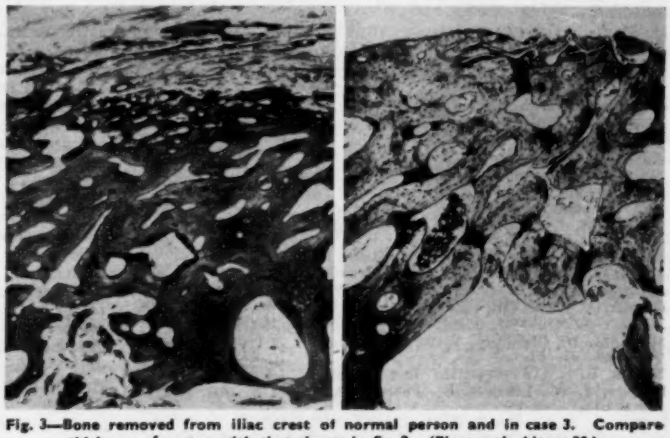

Fig. 3—Bone removed from iliac crest of normal person and in case 3. Compare thickness of cortex with that shown in fig. 2. (Picro-malachite × 20.)

In the absence of any of the recognised causes of osteoporosis, these cases would normally be classified as idiopathic. However, since all four patients developed the condition in close association with childbirth, and have been improving steadily ever since, we suspect that there may be some connection between the condition and childbearing. This suspicion is strengthened by the relative frequency with which idiopathic osteoporosis (though a rare condition) has been reported after pregnancy. Thus, of four cases of idiopathic osteoporosis reported by Albright and Reifenstein (1948) two were young women whose symptoms first appeared soon after parturition. Vaughan Jones (1953) records a case of vertebral crush fractures after eclamptic fits in a patient whose spinal radiographs show the biconcave deformity of the vertebral bodies which is seen in osteoporosis. Gössler (1953) has described a case of idiopathic osteoporosis in pregnancy; Burrows and Graham (1945) have reported a case; and Devenish (1954) has seen another. It must be remembered that osteoporosis cannot be diagnosed with certainty by radiography until it has reached an advanced stage; earlier stages would not be easily recognised unless deliberately sought but they might account for some of the backache which is so common during and after pregnancy. Perhaps also the cough fractures in late pregnancy described by Paulley et al. (1949) are manifestations of the same process.

It is not easy to explain this apparent association between pregnancy and osteoporosis, but it may prove to be related to the increase of adrenocortical activity during pregnancy (Bayliss et al. 1955). Osteoporosis is seen in Cushing's syndrome, and may be yet another point of similarity between Cushing's syndrome and pregnancy.

As our patients have been observed for only a short time, and the period since delivery differed in each case, our data provide little information on the course of the condition. We are inclined to think, however, that an acute decalcifying process began during or shortly after pregnancy (case 2), and 4–6 years later the condition was less active in the sense that symptoms were slight and the urinary output of calcium was normal (cases 1 and 3). We cannot be sure what effect, if any, hormone therapy has had upon the patients.

### Summary

1. In four patients with backache due to spinal rarefaction and compression fractures, the onset of symptoms was related to pregnancy.

2. In each case it was established that the condition was osteoporosis and not osteomalacia, and the term "post-pregnancy osteoporosis" is suggested for the syndrome.

3. The high level of circulating plasma-corticosteroids in pregnancy is invoked as a possible explanation of post-pregnancy osteoporosis.

We wish to thank Dr. Russell Fraser, Prof. G. Bull, Dr. L. P. Laurent, and Mr. Charles Gray for allowing us to study their patients.

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## DRUG-INDUCED ENTERITIS

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STAPHYLOCOCCAL enterocolitis is not a new disease, but it now appears in a particularly virulent form as a complication of "broad-spectrum" antibiotic therapy. Several cases of fatal and non-fatal drug-resistant staphylococcal enterocolitis have been reported in this country in the past year. We wish to record this fatal case following terramycin (oxytetracycline) therapy, to reinforce the warnings given in recent issues of this journal that the tetracycline group of drugs must be used with care and discrimination. It illustrates the rapidity with which drug-resistance may develop, and the fulminating nature of the attack when the patient is already weakened by severe illness.

### Case-record

A man, aged 33, was admitted on Oct. 20, 1954, and a ruptured gangrenous appendix was removed (D. W. S.). After the operation he received, twice daily, penicillin 300,000 units and streptomycin 0·5 g. by intramuscular injection.

*Course of Illness*

The patient had a postoperative ileus, but by Oct. 29 (ninth postoperative day) bowel function was restored sufficiently to allow gradual discontinuation of the gastric suction and parenteral fluids. Progress was not maintained, however, and on Nov. 1 (twelfth day) a diagnosis of small-bowel obstruction was made. He now had a petechial rash over his abdomen and flanks.

At laparotomy (Prof. W. A. Mackey) the abdomen was found full of grossly distended coils of small bowel. This distension was mainly due to foul yellow fluid and only to a very minor extent to gas. Widespread retroperitoneal hæmorrhages of purpuric type involved the posterior abdominal wall and the lower part of the small-bowel mesentery. The obstruction appeared to be largely mechanical, for one of the distal coils of bowel was adherent at several points to an abscess in the anterior part of the abdominal cavity just above the pelvis. This abscess contained foul, thick, whitish-yellow pus. The pus was evacuated, and the adhesions broken down. Thereafter the bowel was emptied of about five pints of foul fluid by aspiration through a gall-bladder trochar and cannula. 'Achromycin' (tetracycline) 1·0 g. in saline solution was introduced into the cavity and the incision was closed in layers.

For eleven days the patient had had 600,000 units of penicillin and 1·0 g. of streptomycin per day. In view of the severity of his illness, the presence of intraperitoneal pus, and the necessarily extensive intra-abdominal manipulations, it was considered advisable, pending a bacteriological report on the pus, to substitute for these two drugs a broad-spectrum antibiotic. Dissolved in a litre of Hartmann's solution, oxytetracycline hydrochloride 0·5 g. was infused twice daily, and ascorbic acid 200 mg. twice daily was also given intravenously.

Immediately after the operation the patient's condition appeared satisfactory; but during the night he became restless and confused, and complained of a choking sensation. Next day (Nov. 2) he had frank tetany (serum-calcium 4·3 m.eq. per litre, alkali reserve 35·0 m.eq.). This was effectively treated with calcium gluconate 20 ml. intravenously, followed by ammonium chloride given through an indwelling gastric tube in ten hourly doses of 2·5 g. dissolved in 150 ml. of water. As the blood showed deficiency of prothrombin and factor VII, vitamin K 50 mg. was given intravenously. The patient was also given a single intramuscular injection of anti-gas-gangrene serum 2 ml., and started on 'Becosyn' 1 and 2 (riboflavine 4 mg., aneurine hydrochloride 10 mg., pyridoxine 4 mg., and nicotinamide 40 mg.) daily by intramuscular injection.

On Nov. 4 there had been considerable improvement. The patient was bright and talkative, and was taking fluids

by mouth with apparent enjoyment. The tongue was clean, the bowels were acting well, and he appeared to be in fluid balance. The intravenous drip was discontinued, and gastric suction gradually stopped. He had had three days of oxytetracycline hydrochloride intravenously (1·0 g. per day) and this was now replaced by 250 mg. six-hourly by mouth.

During the night his condition deteriorated, and on Nov. 5 he was toxic and dehydrated with a choleraic appearance. He also complained of a sore throat, and had passed greenish stools. A tentative diagnosis of oxytetracycline-resistant staphylococcal enterocolitis was supported when examination of a rectal smear showed complete predominance of clumps of gram-positive cocci. The oxytetracycline was immediately replaced by oral erythromycin (400 mg. six-hourly), and yogurt was given. The patient was given a pint of blood followed by other intravenous fluids, but he died at 1.00 A.M. on Nov. 6.

*Necropsy Findings*

On opening the abdomen there was evidence of a healing peritonitis. Several loops of bowel were adherent in the region of the cæcum but no free pus was present. The whole appearance was no worse than that usually found after intra-abdominal manipulation.

A striking feature was the presence of numerous enlarged soft lymph-nodes in the mesentery of both large and small bowel. The mucosa of the lower jejunum and ileum was acutely congested and in the last 2 inches of the ileum enlarged lymph follicles were again a striking feature. The mucosa of the large bowel was congested in its upper $^1/_2$ in. The bowel contents were liquid and dark green in colour.

Greenish pus was found in both main bronchi; both lungs were œdematous and in their lower halves showed tiny areas of bronchopneumonic consolidation. The spleen did not appear unduly abnormal. There was no trace of kidney, ureter, or renal artery on the right side; the left kidney was enlarged but of normal appearance. No significant abnormality was found in any of the other organs.

Histological examination of the small bowel showed an acute inflammation of non-specific type.

*Bacteriology*

Pus taken from the abdominal cavity at the second operation showed a scanty growth of *Escherichia coli* sensitive to chloramphenicol, chlortetracycline, and oxytetracycline, but insensitive to streptomycin.

On Nov. 5, four days after commencing oxytetracycline therapy the stools showed numerous pus cells and gram-positive cocci mainly in clusters, with a few gram-negative bacilli. This was taken to be presumptive of staphylococcal enteritis, and the organism indeed proved to be a coagulase-positive *Staphylococcus aureus*. Using the disc method this proved to be insensitive to penicillin 0·5 μg., chlortetracycline 10 μg., oxytetracycline 10 μg., 'Sulphatriad' 20 μg., and streptomycin 20 μg.; slightly sensitive to erythromycin (10 μg.); and sensitive to chloramphenicol (40 μg.). Blood-culture and throat swab taken the same day grew an identical organism. The urine grew only scanty enterococci.

At necropsy cultures were taken from intestinal contents, mesenteric lymph-nodes, lungs, and spleen, and each produced a *Staph. aureus*.

In all these investigations none of the usual bowel or mouth organisms was obtained, pure cultures of *Staph. aureus* being grown. These organisms all had similar antibiotic sensitivities. Using the tube dilution method they were: insensitive to oxytetracycline up to a strength of 1250 μg. per ml.; sensitive to erythromycin 0·3125 μg., chloramphenicol 6·25 μg., streptomycin 12·5 μg., and penicillin 25 μg. The organisms from the throat (ante mortem) and from the lung and fæces (post mortem) were of the same phage-type (53/75+).

## Comment

The infecting organism seems to have been the *Staphylococcus pyogenes* present in the patient's anterior nares, which after administration of oxytetracycline rapidly became resistant to that drug. The intraperitoneal abscess found at the second operation contained only coliform bacilli on culture; moreover, the staphylococcus isolated, after death, from the bowel and from the lungs was of the same phage-type as that present in the nasopharynx during life.

Hay and MacKenzie (1954) found that in five cases in which phage-typing was done, three different organisms were responsible. As a further check against the possibility that cross-infection by a drug-resistant organism was the source of the infection, all those who had been in contact with two of their cases were swabbed, and none were found to carry resistant organisms.

In our case, the symptoms appeared on the fourth day of oxytetracycline therapy, and by this time the responsible staphylococci were fully insensitive to the drug. In most reported cases the onset has been equally early, and it would appear that drug resistance, if it is going to develop, develops quickly. Oxytetracycline has been given for long periods—in some cases for many months—without adverse effect on the intestinal flora or the development of drug resistance.

In the treatment of staphylococcal enteritis erythromycin is the drug of choice, and staphylococcal antitoxin can reasonably be given to combat the intense toxæmia. Supportive measures include the restoration and maintenance of fluid and electrolyte balance, and intravenous fluids infused at the rate of 1000 ml. per hour may be required (*Lancet* 1954). Yogurt was given in this case in an endeavour to repopulate the bowel with a non-pathogenic organism which would compete with the staphylococcus. There is clinical evidence of its value (Polymenakos 1954), but this needs confirmation.

As already stated, we think it probable that our patient entered the hospital as a nasal carrier of the organism. We suggest therefore that, wherever possible, nasal swabs should be taken from patients who are about to undergo a major operation—especially if an indwelling stomach tube passed through the nose is likely to be used after the operation. Gould and Allan (1954) have reported encouraging results in the treatment of nasal carriers using oxytetracycline cream. In none of their cases did resistance to the oxytetracycline develop, but we feel that the routine use of this drug might be dangerous.

## Summary

Fatal drug-resistant staphylococcal enterocolitis followed oxytetracycline (terramycin) therapy in a patient recovering from appendicitis and peritonitis. Less than 4·0 g. of oxytetracycline had been given when the symptoms first appeared, and despite the use of erythromycin and supportive therapy, he died about twenty-four hours later. A staphylococcus resistant to penicillin, chlortetracycline, and oxytetracycline was isolated from the throat, bowel, and blood, and from the viscera after death.

In treatment erythromycin and staphylococcal antitoxin should be given with supportive measures. This complication could perhaps be prevented by preoperative treatment of nasal carriers by topical application of an antibiotic.

We are indebted to Prof. W. Arthur Mackey and Dr. J. C. J. Ives for their help and advice in the care of this case, and to Dr. P. Pullar for the necropsy findings. We wish to thank Dr. R. E. O. Williams, of the Staphylococcal Reference Laboratory, Colindale, for the phage-typing, also Dr. R. K. Phillips, medical director of Pfizer Ltd., for his interest.

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# VIRILISM DUE TO OVARIAN ARRHENOBLASTOMA

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THE term arrhenoblastoma was first used by Meyer (1925) to describe an ovarian tumour originating from vestigial testicular tissue. He observed that the more differentiated histologically was the tumour the less pronounced was the virilising effect.

Most workers subdivide arrhenoblastomata into three types: the highly differentiated mature type (testicular adenoma of Pick); the intermediate or mixed type; and the undifferentiated or sarcoma-like type. Recurrence is rare in the first but commoner in the third variety. The tumours are small or moderate in size but occasionally may be as large as a man's head. They usually cause symptoms during the reproductive period, and one case at least has been seen as early as at the age of 15 (Novak 1952). Henderson (1951) reported the tumour in two sisters.

Fig. 1—Patient aged 16, showing facial hirsuties (May 2, 1952).

Fig. 3—Patient in May, 1954, two years after removal of tumour.

The incidence of malignancy in arrhenoblastoma is stated by Javert and Finn (1951) to be 22%. They think that it is usually possible to decide whether a tumour is malignant or not on clinical grounds at laparotomy, and they advise radical surgery except in young women with apparently benign unilateral tumours.

There is at present, among pathologists interested in this condition, no general agreement on the classification of virilising tumours of the ovary (arrhenoblastoma, lipoid-cell tumour, ovarian hypernephroma, adrenal-like tumour, adrenal-rest tumour, masculinovoblastoma, luteoma, &c.). Thus Teilum (1946, 1952), Pedersen (1947), and Varangot (1952) classify these tumours as androblastomata and regard the various histological types as growing from a multipotential male mesenchyme cell which has the ability to differentiate in various directions. Novak (1952) and Erez and Yenen (1952), however, regard masculinising luteomas, adrenal-like tumours, and ovarian hypernephromata as originating in adrenal rests within the ovary.

There are many recent good descriptions of the clinical picture associated with arrhenoblastoma—e.g., Forgeau and Gentin (1951), Thomas et al. (1952), Novak (1952), Hughesdon and Fraser (1953), and Smiley et al. (1953). Most workers emphasise that defeminisation takes place first and masculinisation follows later. The decision whether a suprarenal or an ovarian tumour is responsible for masculinisation may, in the absence of a palpable mass, have to await laparotomy. The urinary excretion of 17-ketosteroids may be increased or normal in cases of arrhenoblastoma. If the excretion is increased pre-operatively, one will expect a fall after removal of the tumour; postoperatively repeated estimations may be of some value because an increase in excretion later will suggest recurrence or metastases.

## Case-report

The following case is typical of arrhenoblastoma (intermediate type) developing at an early age.

A schoolgirl, aged 15, was first seen in November, 1951, when she complained that six months previously her singing voice began to break, and later her speaking voice became low-pitched. Three months before being seen she noticed increasing hairiness of the legs and two months later hairiness in the beard area. For six months there had been complete amenorrhœa, before which her periods had been scanty for six months, coming regularly every two weeks. The menarche had been at the age of 13 and the menstrual periods had been normal for a year. She had always been tall for her age, but in the previous year she had grown $1^1/_2$ inches.

*Previous Diseases.*—None of note except psoriasis for many years.

*On examination* she was intelligent, 5 ft. 8 in. tall, and 8 st. $13^1/_2$ lb. in weight. She was obviously worried about the physical changes taking place in her. Her voice was deep, and there was slight hairiness of her upper lip, chin, and cheeks. Pubic hair was of male distribution, and her legs were very hairy. Her thyroid gland was slightly enlarged, and her breasts were small, with a moderate amount of hair round the areolæ. Her external genitalia were normal. Her general configuration was of the male type, with a prominent Adam's apple. Psoriasis was present on the trunk.

*Investigations.*—She was apyrexial; her urine was normal on routine examination; and an intravenous pyelogram and a glucose-tolerance test for five hours were normal. The urinary excretion of 17-ketosteroids was 9 mg. in twenty-four hours (within normal limits). Rectal examination of the pelvis did not reveal any abnormality.

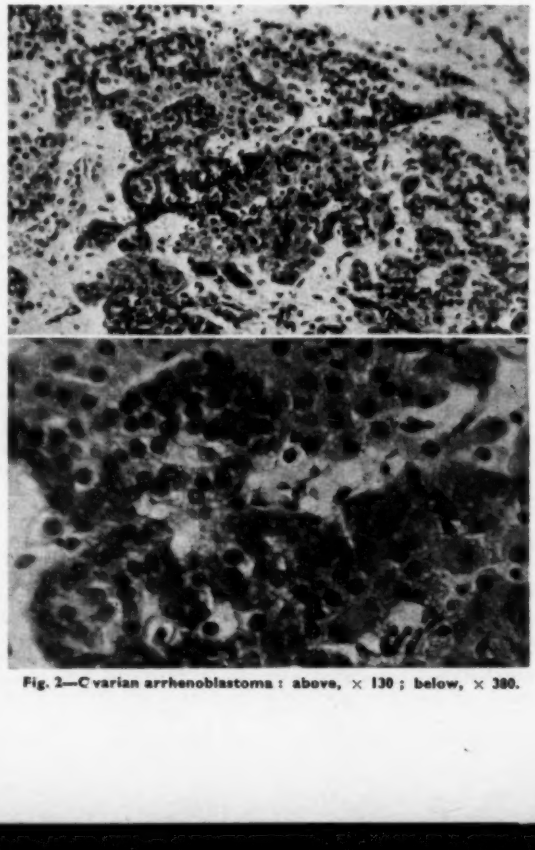

Fig. 2—Ovarian arrhenoblastoma: above, × 130; below, × 380.

*Outpatient Observation.*—In April, 1952, she weighed 9 st. $3^1/_2$ lb., and the hairiness of her chin had much increased (fig. 1).

*On readmission* vaginal examination under general anæsthesia revealed a soft cystic swelling in the left uterine adnexa. The uterus was small and anteverted, the right adnexa felt normal, the clitoris was slightly hypertrophied, and the labia were normal. The urinary excretion of 17-ketosteroids was again within normal limits (7·8 mg. in twenty-four hours).

*Laparotomy* early in May, 1952, showed the left ovary to be cystic and rather smaller than a tennis ball. The right ovary and the uterus appeared normal, and palpation of both suprarenal glands revealed no abnormality. The left ovary was removed and sent to Prof. R. W. Scarff, who reported as follows: "A smooth whitish ovoid tumour $2^1/_2 \times 1^1/_2 \times 1^1/_2$ in. On section this proved to be a unilocular cyst, its wall in many places almost paper thin but here and there thickened up to $^1/_4$ in. by pale brownish-yellow tissue within the fibrous capsule. The inner aspect was uneven, with thin fibrous strands stretching across the cavity in places. Numerous blood-vessels could be seen in the cyst wall. Section showed a fibrous cyst wall within which there was a layer of tumour tissue bounded internally by flattened epithelial cells. The growth was composed of columns and groups of epithelial cells with large darkly staining nuclei and relatively little cytoplasm, in some areas showing attempts at tubule formation. In between the columns and tubules there were groups of larger cells with more abundant eosinophilic cytoplasm, strikingly resembling the interstitial Leydig cells of the testis. The appearances were those of an arrhenoblastoma of the ovary. At one end of the specimen there was recognisable ovarian tissue in which there were small follicular cysts, and a portion of fallopian tube." (See fig. 2.)

*Postoperatively* regular menstrual periods lasting four days restarted after exactly a month. In August, 1952, the patient's face and legs were less hairy, and her breasts were filling out. By April, 1953, there was no hairiness of her face and legs, and her general appearance and manner were more feminine. The psoriasis, however, was worse. By April, 1954, she appeared to be a normal female in every way (fig. 3), although her voice was still low-pitched. Her interests and pastimes were those of a woman. Pelvic examination was normal. Examination in October, 1954, showed no change. The urinary excretion of 17-ketosteroids was still normal.

### Comments

In spite of her youth at the time of diagnosis this patient presented the typical features of defeminisation and virilism due to an ovarian arrhenoblastoma. It is intended to keep her under periodic observation, when her urinary excretion of 17-ketosteroids will be estimated because this may, in spite of normal preoperative readings, help to detect any recurrence.

Most textbooks describe ovarian arrhenoblastoma as very rare, but in a non-exhaustive search of the literature since 1946 twenty-four published cases have been found.

### Summary

A typical example of an ovarian arrhenoblastoma (intermediate type) is described in a girl aged 15.

Our thanks go to Professor Scarff for the histological report and to Mr. T. Crossley for the photomicrographs.

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## TETANUS TREATED WITH INTRAVENOUS MEPHENESIN

DENIS F. DOCHERTY
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JUDGING by the case recorded below, mephenesin can be very useful in the treatment of tetanus. As a muscle relaxant this drug acts centrally, by diminishing the reflex excitability of the spinal cord and not on the myoneural junction like curare. It does not act on the higher centres and therefore does not affect consciousness. Above all, it does not inhibit respiration.

On Oct. 26, 1954, a muscular youth, aged 16, was admitted to the Reedyford Memorial Hospital, Nelson, with tetanus. Seven days earlier he had cut his thumb with a knife in a cowshed and treated the wound himself. Five days after he had wounded his thumb he noticed discomfort in his jaw on eating his dinner. Next morning his jaw and neck felt stiff. He consulted his doctor and was sent to hospital as a suspected case of tetanus.

*On examination* he had a characteristic risus sardonicus and a fair amount of trismus (he could open his mouth only half an inch). He had severe neck rigidity, some opisthotonos, and severe pain in his back muscles. On his left thumb was a dirty-looking scab about an inch long.

*Treatment and Progress.*—On admission he was given mephenesin 1 g. and antitetanic serum 100,000 units intravenously. He was heavily sedated and given penicillin 500,000 units six-hourly. Intravenous mephenesin 1 g. controlled his spasms for only about two hours; consequently within the first ten hours in hospital it was necessary to give five such injections. We then decided to set up an intravenous isotonic infusion of 4·5% dextrose and 0·18% sodium chloride, containing mephenesin 4 g. per litre to maintain a constant blood-mephenesin level and to be able to increase or decrease it at will by adjusting the rate of the drip flow. We added 5000 units of heparin to each litre bottle. To control the spasms a litre of this solution was used every six hours. After thirty-six hours we increased the strength of mephenesin in the dextrose-saline solution to 6 g. per litre and gave about 3 litres of this solution every twenty-four hours. This rate was maintained for ten days, the drip sometimes being run as slow as 25 drops per min. when no spasms were occurring and sometimes as fast as 160 drops per min. when the spasms were severe.

At no time was there any depression of respiration or any sign of hæmoglobinuria. After ten days the spasms diminished in intensity and frequency, and the amount of mephenesin required to control them fell proportionately. The dripper was discontinued after two weeks, when 198 g. of mephenesin had been given. The patient made an uneventful recovery and was discharged just three weeks from the day of admission.

The hæmoglobinuria that is sometimes caused by intravenous mephenesin is probably due to the fact that the osmotic pressure of a 10% solution of mephenesin is at least six times that of an isotonic solution. Thus multiple injections of a 10% solution directly into the blood-stream will very likely cause hæmoglobinuria. The reason why we were able to give 198 g. of mephenesin in two weeks without causing hæmoglobinuria was probably that we gave it in isotonic dextrose-saline solution, thereby reducing its osmotic pressure to a level at which it has no effect on the red cells.

The treatment of this severe case of tetanus, in which the first signs appeared less than five days after the initial infection, resolved itself into a matter of sedation, antibiotics, and an intravenous infusion of mephenesin in isotonic dextrose-saline solution, of which up to 18 g. was given in twenty-four hours, and maintained for at least two weeks, without ill effect.

I am grateful to Mr. D. A. Richmond and Dr. J. Shafar, under whose care this patient was treated, for permission to publish, and to Mr. Lloyd Hagan, Chief Pharmacist at the Hospital, for his advice and help in all phases of the treatment of this case.

# Reviews of Books

## Die Brucellose als Anthropo-Zoonose

*Febris Undulans.* W. LÖFFLER and D. L. MORONI of the University Medical Clinic, Zürich; W. FREI, formerly of the Veterinary Pathological Institute of the University. Berlin: Springer. 1955. Pp. 193. DM. 29.60.

DESPITE the voluminous literature on brucellosis, few if any textbooks are comprehensive, and this book makes no claim to fill the gap. But by joining forces to coördinate and expand two earlier publications on the disease in man and in animals, the authors have covered a very wide field. This valuable coöperative effort by the medical clinic and the veterinary bacteriological institute of the University of Zürich was inspired by an investigation of the "incomplete antibodies" giving rise to the blocking phenomenon for which the Coombs test was designed, and by the alarmingly high infection with brucella of Zürich's milk-supply. Brucella infection of the udder was found to be thirty times as common as tuberculous infection in the herds. The authors also felt that the time had come to review the effect of antibiotics on therapy of human and animal infection.

The title, by putting human brucellosis in the same class as animal zoonoses, tends to obscure the fact that brucella is the outstanding example of the group of infections of which animals are the sole reservoir, and the authors only hint at the difficulty of eradicating the animal, and consequently the human disease. This difficulty is greatest in backward countries where goats are the chief reservoir of infection; but even in countries such as the United States and the United Kingdom the sharp reduction of bovine disease has revealed a hard core which is still causing a considerable number of human infections. It is, therefore, curious that the authors have not described more fully the disease in wild animals, for this may account for some of the mysterious reinfections of herds of cattle despite elaborate precautions. Rather more than a page is given to avian infection, but the part which birds may play in the mechanical spread of infection is not mentioned. On the other hand, such difficult problems as agglutination-blocking and the significance of skin allergy are handled with great skill and judgment.

## Leg Ulcers

*Their Causes and Treatment.* S. T. ANNING, T.D., M.A., M.D. Camb., M.R.C.P., assistant physician, dermatological department, the General Infirmary, Leeds. London: J. & A. Churchill. 1954. Pp. 178. 18*s*.

IN this small, readable monograph Dr. Anning has successfully reviewed and integrated the extensive literature on this subject, and he gives 20 pages of references. The survey of his own work includes an excellent section on non-surgical methods of management. As a dermatologist Anning gives little space to surgical methods, and this may mislead the reader into thinking that surgery has no place in treatment. He emphasises the relation of most ulcers of the leg—even those associated with obvious varicose veins—to previous deep thrombosis. This view, which is rapidly gaining ground, is in full accord with all modern work on the subject. The chapters on ætiology and differential diagnosis are good. He writes agreeably and approaches every aspect from its historical angle—which makes for interesting and sometimes amusing reading.

## Maladies des os et des articulations

STANISLAS DE SÈZE, professeur agrégé à la Faculté de Médecine de Paris; ANTOINE RYCKEWAERT, médecin assistant des Hôpitaux de Paris. Paris: Flammarion. 1954. Pp. 1240. Fr. 9300.

THIS massive tome is one of the seventeen volumes on every branch of medicine so far published by this firm with many more still to come.

It is in loose-leaf form and can be brought up to date by annual additions. The necessary metal-work contributes to its weight, and at $8^1/_4$ lb. it is no bedside book: it demands, indeed, an armchair and lectern. But it is written in straightforward style easily read by those with only a fair knowledge of French. The lay-out is clear, and the illustrations, particularly radiographs, are well produced; but the index is far too short to be of any real use. It naturally expresses the French approach to orthopædic problems, and—a criticism which applies equally often to British and American works—the references are patriotic rather than world-wide. Treatment is described relatively briefly: many possibilities are offered, but the writer's preference is not sufficiently indicated.

The book is rather too long for the average student, but with suitable annual additions may, in France, take the place of the "Year Books" from Chicago which are so useful to the English-speaking world.

## Lecture Notes on the Use of the Microscope

R. BARER, M.C., M.B., B.SC., demonstrator in anatomy, University of Oxford. Oxford: Blackwell Scientific Publications. 1953. Pp. 76. 6*s*.

MEDICAL students are seldom taught the principles of microscopy in any detail, and often come to use their microscopes as many drivers use their cars—without much understanding of the works. This little book not only explains how a microscope should be used, but also gives a short account of the optical principles on which it is designed, and of the structure and purpose, as well as the care and management, of the various parts. Any student beginning microscopical work should be glad to read quickly through it, and to have it to refer to if he gets into difficulties.

## Développement psycho-moteur du premier âge

Dr. CYRILLE KOUPERNIK. Paris: Presses Universitaires de France. 1954. Pp. 197. Fr. 500.

André Thomas and his collaborators have made comprehensive neurological studies of the developing infant. Dr. Koupernik's little book is a kind of handy guide to such major works. Though he seems to have written it hurriedly—there are misprints and some ill-founded assertions—he has done a service by drawing attention to the neural significance of phases of physical development and by pressing the point that central nervous disorders in infants can and should be diagnosed early.

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**Atlas of Congenital Cardiac Disease** (New York: American Heart Association. 1954. Pp. 62).—It is nearly twenty years since Maude Abbott's *Atlas* was first published, and for some years it has been unobtainable despite many requests for its republication. Now, thanks to the American Heart Association, a splendidly produced reprint has appeared. This work has long been regarded as a standard classic; and, apart from James Brown's book, nothing comprehensive on the subject was published until Dr. Helen Taussig's monograph, which had the advantages of adding surgical experience to clinical and necropsy observations. But even the advent of more accurate assessment and operative findings does not detract from the value of the *Atlas*. In this each page of illustrations faces a descriptive text, which contains valuable references and histological data. The first part deals with embryology and comparative anatomy, while the second is a clinical classification divided into acyanotic and cyanotic groups. There is also a chart analysing the 1000 cases on which the *Atlas* was based.

**Isaac and Œdipus** (London: Routledge & Kegan Paul. 1954. Pp. 131. 15*s*.).—In this scholarly book the late Dr. Erich Wellisch put forward his view that the theme of the binding and symbolic sacrifice of Isaac, the only-begotten and dearly loved son, by his father, Abraham, represents a spiritually and culturally higher solution of the central parent-child conflicts than the Œdipus complex. Wellisch saw the father-son conflict in three historical stages: first, the primitive society where rivalry between father and son led often to infanticide; then the compromise, tragic and unstable, of the Greek philosophy, which sees man as the hapless plaything of the gods, yet guilty for his own crimes; then the biblical solution, paving the way for a loftier concept both of parent-child relationships and of the nature of God. The theological commentaries, iconography, and legends connected with the Akedah are well set out.

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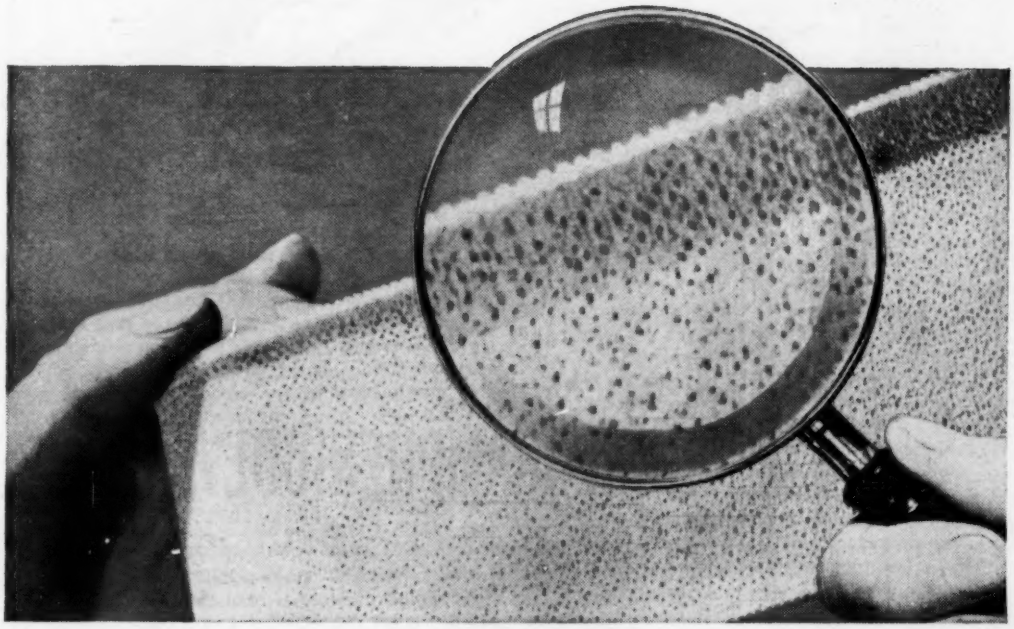

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THE LANCET
*LONDON: SATURDAY, FEB. 26, 1955*

## Enough Doctors?

As reported in our Parliamentary columns, the Minister of Health announced last Monday that he has appointed a committee to inquire into the number of doctors needed for the future. In considering this question three and a half years ago [1] we tentatively concluded that the number of doctors qualifying annually in England and Wales was about 200 in excess of the number of permanent posts available in the National Health Service (as consultants or principals and partners) and in the other services, while in addition there was a yearly surplus of some 300 from Scotland. Since that time the British Medical Association has expressed growing—and very proper—anxiety about the possible effects of such a surplus continuing; and Ministerial action was expected sooner. But the delay has the advantage that the committee will have more solid evidence on which to work. When we made our own estimate the N.H.S. was in its early stage, but it has since expanded considerably, and a clearer picture of its permanent structure can now be formed. The figures appearing on p. 449 show a rise in the total of consultants in Great Britain from 6476 in 1951 to 7136 by the middle of 1954; and during the same period many new practices have been formed in under-doctored areas, and many assistants have been made partners or principals. Even so, the prospects of a doctor becoming a consultant between the ages of 35 and 40, or a principal or partner in general practice between 30 and 35, are still not as good as they should be. The expansion of consultant posts has somewhat exceeded what was forecast; but the number of new consultants has not increased correspondingly, since some of the new posts have been filled by men already established. The figure given for senior registrars in specialist training (943) is approximately related to the expected needs of future replacement and expansion; but it probably does not include a number holding academic appointments, and it specifically excludes 363 "others," many of whom are in what are euphemistically described as "transitional posts," after completing their training, and are trying to obtain consultant or equivalent appointments. The plain fact is that there are still far too many applicants for consultant posts, and that entry into general practice is too difficult—though it would perhaps become easier if young doctors were more willing to follow the Minister's advice to go North. In contrast to the abundance of senior registrars, there is a continued shortage of junior hospital staff, especially registrars.

The present situation reflects the uncertainties of a developing service, aggravated by the post-war popularity of medicine as a career; and it may well need special remedies. The committee's main task, however, will be to look ahead. Since 1947 some 3000 doctors a year have been added to the Medical Register. There was a remarkable fall to 2320 in 1953, but this was partly artificial, because many had registered early (in 1952) to avoid provisional registration. The numbers of students reported as beginning the study of medicine in Great Britain and Ireland have declined steadily from 2725 in 1949–50 to 2280 in 1953–54, but this reduction will not have its full effect on qualification until 1957. The total of 7000-odd consultants has now reached the figure mentioned by the Ministry of Health in its original memorandum on consultant and specialist services; but it falls short of the optimum, particularly in some of the specialties. The number of doctors who will be required in general practice, for expansion and for replacement, is again not easy to predict—especially as we must remember that the traditional, and persisting, pattern of practice was determined as much by the economic prospects for the doctor as by the needs of the population. The number of new practices required to bring under-doctored areas up to the average level can be estimated with fair accuracy; but there is still no retiring age by which to calculate the needs of replacement. The terms of the Danckwerts award may eventually enable general practitioners to retire earlier.

To see further ahead is naturally even harder. The present establishment of the N.H.S. is necessarily a compromise between the needs of the community and the amount of money it is prepared to spend on health. We can do no more than guess at the ideal future ratio of doctors to the population. Some of the work which they do now may one day be delegated to ancillaries [2]; but, on the other hand, if their energies were not so fully occupied with curative medicine, they could devote more of their time to advising their patients in the broader aspects of health. Maternity and child-guidance centres have shown what can be done in a limited field, and experience gained from new housing estates may considerably widen our concept of the family doctor. A real effort to practise more preventive medicine would help to reverse the tendency to centre medicine on the hospital.

Though it will obviously be impossible for the new committee to answer all the questions which arise, we hope it will be able to consider some of them. The immediate task is to survey the numbers of doctors needed by the N.H.S. and the other services as they exist today. As regards the supply of doctors to the profession, it is clear that—though medical schools have so far found little difficulty in maintaining either the quantity or the quality of their entry—the demand for medical training has slackened a little. The slackening is due partly to an expected reaction from the post-war enthusiasm, and partly

1. *Lancet*, 1951, ii, 331; *Ibid*, 1953, i, 779.

2. *Ibid*, 1953, i, 29.

perhaps to greater success on the part of schoolmasters in discouraging unsuitable candidates; but one reason for it, undoubtedly, is anxiety about the prospects of a medical career. Clearly, if we are to maintain our standards—let alone raise them—would-be students must be confident that places in the medical schools are related to opportunities of employment after qualification. The committee will perform a most valuable service if it can give a realistic and fairly precise estimate of present needs as well as indicating the kind of future developments that may make periodic revision necessary.

## Cytotoxic Agents in Malignant Disease

THE value of cytotoxic agents, especially the nitrogen mustards and similar mitotic poisons, in the treatment and control of the reticuloses and chronic leukæmias is now well known [1]; and a protracted study of one of these substances, 'Myleran,' in chronic myeloid leukæmia is described on an earlier page of this issue by Dr. GALTON and Dr. TILL. The success of these drugs has very naturally led to their trial in malignant diseases of the hæmopoietic system (including lymphosarcoma and reticulosarcoma) and of other systems. Unfortunately the results have not been very encouraging.

In 1951 PATERSON and BOLAND [2] reported that tretamine (triethylene melamine, T.E.M.) had no effect in 3 cases of carcinoma of various types. WRIGHT et al.[3] found that tretamine had no detectable effect in 12 patients with carcinomas; 4 patients with fibrosarcoma seemed to improve, but 6 with other types of sarcoma were unaffected. Only in some cases of bronchial carcinoma have results been unequivocally favourable. LENTI and GAVOSTO [4] gave tretamine to 10 patients with this type of carcinoma and noted temporary symptomatic and radiographic improvement in 2. RAPHAEL and REILLY [5] used the standard nitrogen mustards to try to alleviate the effects of inoperable bronchial carcinoma; of 56 patients treated, 15 were judged to have gained significant palliation, which was especially noticeable in those with symptoms from obstruction of the superior vena cava. SALINE and BAUM [6] administered tretamine by mouth to 15 similar patients in doses of 5 mg. daily for four days, followed by 2·5–5 mg. at intervals varying from one to six weeks according to the clinical response and the effect on the blood. They observed useful alleviation of signs and symptoms in 4 patients, in each of whom there was evidence that the superior vena cava was obstructed. All the patients died eventually, but their comfort in the survival period was notably enhanced. SALINE and BAUM found 3 instances of the toxic effect of tretamine on the blood-forming tissues, and in 1 patient cortisone was given before the aplastic anæmia remitted.

In frank malignant disease of the hæmopoietic system mustards are less effective than in relatively benign conditions such as chronic leukæmia and Hodgkin's disease. MEYER et al.,[7] reviewing the effect of tretamine on diseases of the lymphatic system, classed lymphosarcoma among the least responsive lesions, and chronic lymphatic leukæmia among the most responsive. WINTROBE et al.[8] held that tretamine was of little value in lymphosarcoma or reticulosarcoma, and pointed out that some patients with these diseases developed serious hæmopoietic depression when treated with this drug. BLACKBURN and KING [9] had no success from administration of tretamine to 4 patients with reticulosarcoma.

These results are disappointing. It seems to be hardly worth exposing patients to the discomforts and risks of cytotoxic chemotherapy for so uncertain a benefit. Intravenous mustard is liable to induce vomiting, which is especially undesirable in patients with bronchogenic carcinoma and obstruction of the superior vena cava, who seem to be the only group who are benefited at all consistently. In such cases tretamine, which is less liable to cause vomiting, may be given orally. But tretamine has its own set of disadvantages, including extreme variation in the effective dose between one patient and another, and considerable risk of irreversible aplastic anæmia.[1] It is not surprising that tretamine has not been generally issued for the use of practitioners in this country—restraint for which we should be grateful to the manufacturers. The effectiveness of the cytotoxic agents in chronic leukæmias, Hodgkin's disease, and some of the other reticuloses is now established. These conditions are not usually classified as "malignant," though they sometimes terminate in a malignant phase. In the truly malignant diseases radiotherapy clearly continues to hold the field for alleviation, palliation, or even cure—judging by the results after five years. When radiotherapy fails in malignant disease, chemotherapy still cannot take over.

## Protecting the Motorist

THE motor-car that is badly driven or mechanically at fault is a grave menace to pedestrians and cyclists. But, as we all know, the motorist himself is also exposed to substantial hazard; and study of injuries to drivers and passengers may suggest methods of prevention. A large proportion of such injuries seem to be due to unexpected sudden loss of speed. (Colonel A. R. FORBES, of the Royal Society for the Prevention of Accidents, has pointed out [10] that when a car crashes after being pursued the occupants not uncommonly leap out uninjured; and such relative immunity, he suggests, may be due to the driver and passengers holding themselves ready for a collision.) This impression is strengthened by LIVINGSTONE'S [11] analysis of some 3000 non-fatal injuries to motorists. LIVINGSTONE found that about two-thirds of the injuries were apparently due to impact or crushing and one-third to "whiplash" strain, wrenching, or protective rotation. Whiplash strain of the neck is due to momentum carrying the head forward on the trunk (or backward if the car is struck from behind). The driver is more liable than passengers to injuries of the

1. *Lancet*, 1954, i, 1118.
2. Paterson, E., Boland, J. *Brit. J. Cancer*, 1951, **5**, 28.
3. Wright, J. C., Prigot, A., Wright, L. T., Arons, I. *Arch. intern. Med.* 1952, **89**, 387.
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10. Personal communication.
11. Livingstone, R. G. *Surgery*, 1954, **36**, 1059.

chest, because of the steering-wheel; but this protects him somewhat from injuries to legs and pelvis, which are commoner among passengers. Rather surprisingly LIVINGSTONE found that the side of the car was almost as usual a source of injury as the structures on the front of the interior—a finding which may reflect the present-day preference for the wide saloon without the running-boards which give strength and protection. In this series there was but 1 case of burns—from a lighted cigar—and indeed it is now very rarely that a car bursts into flames after a crash. The series included only 3 cases of cuts from flying glass—sure evidence of the benefits of safety glass, which is now fitted almost universally, although in this country the law demands only that it be used for windows facing fore and aft. Safety glass is of two main types—laminated and toughened.

*Laminated glass*, which comprises two sheets of glass with a plastic interlayer, was introduced into this country in 1912 and is still used for windshields in North America, where its fracture occasionally causes wounds and abrasions.

*Toughened glass*, introduced in 1933, is made by heating the sheet of glass to near softening-point, and rapid "quenching" by blowing cold air on the surfaces; the effect is to produce compression on the surfaces and, in equilibrium with that, tension inside the glass. Such glass is now used in 90% of cars for the home market; and, according to the British Standards Institution, "since 1933 . . . not one single accident has been reported in which serious injury has resulted from sudden disintegration of the glass."[12] One criterion in standardising the glass is the size of particles on fracture. Here two conflicting factors have to be considered: on the one hand, the larger the particles the less will visibility be impaired; on the other, the smaller the particles the less will be the risk of injury. After exhaustive tests a revised British Standard[13] last year laid down that the glass should break into not less than 20 particles per sq. in., compared with not less than 40 in the previous standard.

What further precautions might prevent injuries? Increase in the strength of the body would involve increased weight, and thus a more powerful and less economical engine; and stouter pillars might themselves be a source of accidents by limiting the driver's vision. Projections inside the car should be as few as possible. Outside, door-handles and hinges are usually recessed; but within, projecting window-handles persist. When recently a famous maker produced a model with balanced windows which could be raised and lowered by hand and held in place by a simple locking device on the door-panel there were complaints from purchasers, who apparently thought that they were not getting value for money; and the usual winding-handle had to be restored. The rear seats could be fitted to face backwards, as in aeroplanes, without much trouble; but the back of the body would have to be redesigned to allow adequate vision to the exterior, and it is very doubtful whether the public would take kindly to this rather unsociable arrangement. Upward extension of the backs of seats, to provide a rigid head-rest, should prevent whip-lash injuries in collisions from the rear, but would be useless in the more common head-on collision unless the head were held in place by a forehead-band—a device that motorists would hardly welcome. A safety-belt such as that used in aeroplanes might be slightly more acceptable. This would have to be attached to the floor of the car or, for the rear seats, to a cross-member. Undoubtedly such a belt would prevent many injuries to the pelvis and legs; and for protection against injuries of the back (and, in the case of the driver, to the chest), it should extend upwards over the thorax, like a corset. But those who travel by air know with what relief they undo the belt, if it has been pulled fairly tight—as it should be—and it is questionable whether the motorist would wear it for long, at least in summer, or would bother to attach it for short journeys. But at least seats could be securely anchored; at present many are not. A collapsible steering-column would prevent crushing wounds of the driver's chest; but when the driver treads on the brakes in an emergency he presses very heavily with his hands on the steering-wheel, and if this gave way braking might be dangerously impaired: the critical strain would necessarily have to be so great that the driver's chest would still be in peril. Again, the dashboard could be made of some material that would be rigid enough to support instruments and pockets but in collisions would make a less severe impact on the passenger's knees or face. The occupant of the place beside the driver is more liable than anyone else in the car to leg injuries; and in the U.S.A. this place is known as the suicide seat. Some American cars include a "crash-pad"—usually a thick roll of sponge-rubber—running along the upper edge of the dashboard. Such a pad should be particularly helpful for children; but sponge-rubber may not be the material of choice. WHITE,[14] in a striking indictment of the design of American cars, insists that, because of its quick recoil, sponge-rubber should not be used; instead he recommends a light metal or other material that will fracture or yield on impact. Sometimes the effects of an accident are made worse by passengers being flung out when doors fly open. Attention should be given to designing doors that will remain shut in an accident and yet can be opened readily in an emergency; and hinges should always be on the forward edge of the door.

GISSANE[15] has remarked that "the British motor car industry could perhaps gain considerable prestige by exploiting the design of a really safe car." But car manufacturers—like the makers of shoes and other commodities marketed competitively—are much concerned with what the public are prepared to buy. Purchasers of cars may be reluctant to pay for safety devices unless these are conclusively and repeatedly shown to be of value. Crash-helmets have for almost fifteen years been widely known to be an indispensable safeguard for the motor-cyclist; yet it is only in the past three or four years that they have been much worn. Lately at least one insurance broker has reduced by almost half the premium for personal accident insurance of motor-cyclists who wear an approved crash helmet. Motorists might be more willing to pay a little extra for safety devices if, in return, their premiums were reduced. Unfortunately the statistics which have justified the reduction in the case of motor-cyclists are lacking in regard to motorists, partly because the value of any single physical safeguard is much less readily established, and partly because, alone or in combination, such safeguards have not been fully tested.

12. British Standards Institution, CT(OC)3165, May 13, 1954.
13. B.S. 857/1954. Safety Glass for Land Transport.
14. White, A. J. The Truth about American Cars. Published by Motor Vehicle Research Inc., So, Lee, New Hampshire, U.S.A. 1953. Pp. 48. $1.
15. Gissane, W. *Practitioner*, 1954, **172**, 620.

# Annotations

## CYCLOSERINE

ANOTHER antibiotic derived from the streptomyces group of fungi has been discovered. The first accounts of it—not yet published—were given at a Veterans Administration conference at Atlanta on Feb. 9.[1,2] Cycloserine is said to be a broad-spectrum antibiotic active against tubercle bacilli; it can be administered by mouth, and preliminary clinical reports from the Metropolitan Hospital, New York, are sufficiently promising to have justified the Veterans Administration starting a large trial immediately. So far there is no information about toxicity or bacterial resistance.

Experience in the past ten years with antibacterial drugs in tuberculosis has shown what a large amount of laboratory and clinical investigation is needed before the value of a drug can be even roughly assessed. But such experience has also led to the evolution of efficient organisations for coöperative research; and the speed with which they can produce practically valuable facts was well demonstrated by the Medical Research Council's early investigation of isoniazid three years ago.[3] Cycloserine is said to be difficult to manufacture, and it is not yet being produced commercially either in this country or in the U.S.A.; but, if further clinical trials prove it to be valuable, it will be marketed under the trade name 'Seromycin.'

## THE PSYCHIATRIC DAY-HOSPITAL

THE idea of the day-hospital for treating patients with nervous and mental disorders without increasing the demand on hospital beds was conceived independently by Bierer in this country and by Cameron in Montreal; and many psychiatrists are now interested, as was clear from a meeting at the Marlborough Day Hospital, London, on Feb. 15. This meeting was opened by Dr. Aron, who has himself been instrumental in setting up a day-hospital in Bristol.[4]

Some mental hospitals allow outpatients to attend daily for psychotherapy and occupational therapy, but several speakers suggested that this hardly constitutes a day-hospital, which is a self-contained community in which the therapy derives from the community itself. It was generally agreed that the day-hospital should be an independent institution, but close liaison with local mental hospitals (as in Bristol and Montreal) or with a general hospital was desirable. The facilities at the Marlborough and the Bristol day-hospitals include individual and group psychotherapy, occupational therapy, social clubs, art therapy, and physical treatments such as electroshock and modified insulin. In Cameron's[5] opinion certain types of patient are best treated initially in a mental hospital and then transferred to the day-hospital. Bierer[6] listed fourteen categories of patients suitable for attendance at the day-hospital. Cameron's list is roughly the same, but he also admits relatively advanced schizophrenics and manic-depressives—even some with hallucinations or with suicidal ideas. Dr. E. G. W. Cross (who is now in charge of the Bristol day-hospital) said that some types of psychopaths and chronic inadequate neurotics have to be excluded, but he has found that many chronic women neurotics derive more help from the day-hospital than from the neurosis centre. He claimed that the staffing was very economical, since only one psychiatrist (himself) carried out all the therapy and ran the clubs, with the aid of one social therapist on a half-day a week, one secretary on two and a half days a week, a sister, a staff nurse, three ward orderlies, and a help. Dr. Aron remarked that excessive economy in staffing, especially of psychiatrists, should be avoided. The patients needed much psychotherapy and attention from psychiatrists if they were to benefit from attendance. The relative cost of the day-hospital patient in London and Bristol, compared with that of the mental-hospital inpatient, was estimated at about a third—an estimate that agrees with Cameron's in Montreal.

Some speakers emphasised the advantage of the day-hospital in dealing with the over-dependent type of neurotic patient. Dr. Bierer claimed that the preservation of contact with the outside community and the reality-situation constituted one of the main therapeutic factors; and Dr. Cross considered that the day-hospital, without becoming a dumping-ground, could prevent the escape into mental hospital of many patients. Dr. Donald Blair also was strongly of the opinion that day-hospitals could replace 80% of the mental-hospital accommodation, and that it was very bad for most neurotics to stay more than a few weeks in a neurosis centre; for if they stayed longer it was almost impossible to induce them to take up once more the ordinary responsibilities of home and work.

## PROGNOSIS IN BRACHIAL-PLEXUS INJURIES

A YOUNG engineer finishes his work, mounts his motor-bicycle, and hurries home to spruce up for a date. There has been a slight drizzle, he brakes hard to avoid a child and over he goes. Thanks to the pioneer work of the late Sir Hugh Cairns his helmet saves him from a serious head injury, and he is lucky to escape with no broken bones. He just cannot use his right arm.

There must be few days in the year without an injury of this sort in the British Isles. Attempts to repair the plexus have been unrewarding, and even exploration has been decried because it yields little information of value and some which may mislead. Yet, although the surgeon is virtually helpless to speed recovery, he can operate to make the limb less of an encumbrance or even an asset.[1] The great stumbling-block has been the difficulty of prognosis in complete lesions, and a patient may have to wait many months and receive countless manipulations from the physiotherapist before it is finally decided that no recovery will take place and reconstructive surgery is required.

Work by Bonney,[2] although aimed at determining the exact site of the lesion in brachial-plexus paralysis, may throw much-needed light on prognosis. He studied the axon responses in 13 patients with complete traction injuries of the brachial plexus. The response to an intradermal injection of histamine was tested on the radial and ulnar sides of the forearm and hand. In the fingers the cold vasodilator response was measured at the finger-tips by means of heat-flow discs of tellurium and copper. A positive response in either of these tests depends on the integrity of the cutaneous axons to the area tested. In 9 of the 13 patients some positive response was obtained—which strongly suggested that the sensory loss in these areas was due to a preganglionic lesion, leaving the postganglionic axon intact to subserve the response. These observations were compared with the local lesion by thorough exploration of the plexus. The correlation of positive axon response in the limb with the finding of myelinated fibres in the appropriate root of the plexus was remarkably close, and clearly pointed to a preganglionic site of injury of the particular plexus-roots. In this small series useful recovery ensued in 2 of the 4 cases where there was no axon response and thus a more distal injury, but in only 1 of the 9 in which a positive

1. *New York Times*, Feb. 10, 1955.
2. *Times*, Feb. 11, 1955.
3. Medical Research Council. *Brit. med. J.* 1952, ii, 735.
4. Aron, K. W. *J. ment. Sci.* 1953, **99**, 564.
5. Cameron, D. E. *Mod. Hosp.* 1947, **69**, no. 3.
6. Bierer, J. The Day Hospital. London, 1951.

1. Hendry, A. M. *J. Bone Jt Surg.* 1949, **31B**, 42.
2. Bonney, G. *Brain*, 1954, **77**, 588.

response was elicited and the lesion was likely to be high.

Further study is clearly necessary to confirm this first impression of a poorer prognosis with a lesion which is, at any rate partly, preganglionic and close to the cord. Bonney's work clarifies two previously misleading findings in exploration of the plexus—a normal-looking plexus, and myelinated fibres in a funicular biopsy of cords or roots. Both are consistent with a severe, and probably irreparable, lesion above the posterior-root ganglion and close to the cord. Testing the axon responses in cases such as this may avert an unwarrantably hopeful prognosis and rightly lead to prompt reconstructive surgery.

## FLAVONOIDS AND THE THYMUS

SOME plants contain large amounts of flavone derivatives, which often account for the yellow colours. A flavonoid may be an essential food factor at least for the guineapig; and "vitamin P," which Szent-Györgyi extracted from the skin of citrus fruits and paprika, seems to be a mixture of flavone derivatives. Hitherto these substances have not been isolated from animal tissues.

Szent-Györgyi, who in 1928 first isolated vitamin C from the adrenal gland, has now found a flavonoid pigment in the thymus gland. At a conference, held in New York, on the biochemistry of flavonoids he showed 1·5 g. of a yellow powder which he had extracted from more than 15 kg. of calf thymus glands.[1] In man the thymus grows until the age of 2 and persists until puberty; then it usually atrophies. Its function has not been discovered. Reports that an extract delays the onset of first heat[2] and that phosphorylated hesperidin (a flavone derivative) diminishes fertility[3] may gain new significance in the light of Szent-Györgyi's discovery.

## VITAMIN C AND INFECTIONS

VITAMIN C, in addition to influencing wound healing, is believed by many to combat infection. The cause of this possible effect is obscure; but ascorbic acid (vitamin C) in the presence of oxidising agents degrades many polysaccharides.[4–6] Polysaccharides in bacterial-cell walls might therefore be attacked; and the bactericidal effect of a mixture of ascorbic acid and oxidising agent[7,8] might be due to this action. A further possible effect is on mucin. Despite its useful lubricating functions in the body, mucin may aid infective processes by protecting pathogenic micro-organisms from the attack of the body defences and by enhancing their virulence.[9,10] Therefore ascorbic acid together with oxidising agents, by attacking local accumulations of mucin, may promote resistance to infection and recovery from attacks by fungi, trypanosomes, bacteria, and viruses.

Treatment with ascorbic acid and percarbonate has been reported to result in rapid improvement in stomatitis, gingivitis, and oral mycosis; and Ericsson[11] suggests that topical application to epithelium-covered surfaces may be helpful in many infections. But, since mucoids in the tissues might be attacked, it would seem advisable to exercise caution in applying this treatment to mucous membranes.

1. *New York Times*, Feb. 12, 1955.
2. Comsa, J. *Ann. Endocr., Paris*, 1951, **12**, 91.
3. Sieve, B. J. *Science*, 1952, **116**, 373.
4. Robertson, W. van B., Ropes, M. W., Bauer, W. *J. biol. Chem.* 1940, **133**, 261.
5. Pirie, A. *Brit. J. exp. Path.* 1942, **23**, 277.
6. Hale, C. W. *Biochem. J.* 1944, **38**, 362.
7. Strangeways, W. I. *Ann. trop. Med. Hyg.* 1937, **31**, 405.
8. Jungeblut, C. W. *J. exp. Med.* 1939, **70**, 315.
9. Olitzki, L. *Bact. Rev.* 1948, **12**, 149.
10. Florey, H. W. *Proc. roy. Soc.* B, **143**, 147.
11. Ericsson, Y. *Acta. path. microbiol. scand.* 1954, **35**, 573.

## ARTIFICIAL FEEDING OF INFANTS

PÆDIATRICIANS have been telling us for a long time that in the artificial feeding of infants the quantity of the feed is just as important as its quality; and many of them believe that the artificially fed infant is too often artificially *under*fed.[1,2] Their opinion has lately been convincingly confirmed by Hytten and MacQueen,[3] who, using an ingeniously simple method, determined accurately how much fluid, protein, fat, and carbohydrate were received by a series of 100 infants under three months of age, all reared at home. They found that 69% of the infants were receiving less than the generally accepted requirement of 50 calories per lb. (120 calories per kg.) per day, and 49% were getting less than 100 calories. Underfeeding to this degree is a serious matter; but its correction should not be difficult, since about 75% of artificially fed infants receive the same type of food—namely, National dried milk.

Of the causes of underfeeding, the most important is the instructions given on or in the tin of dried milk. It is debatable whether such instructions should be given at all; and in the U.S.A. manufacturers advise parents to consult their doctor about details of feeding. The instructions provided with a tin, even if they were correct (which is seldom the case), could not possibly deal with the individual variations of particular infants. Hytten and MacQueen point out that the instructions issued with National dried milk fulfil the infant's calorie requirements only if the measure is tightly packed with full-cream powder, but mothers are not told this. With part-skimmed milk, even tight packing cannot meet the calorie requirements. The measure of sugar—usually expressed in teaspoonfuls—may also be very inaccurate. The late Eric Pritchard had a collection of spoons, all sold as teaspoons, whose liquid capacities varied from 30 to 90 minims; when measuring sugar the variation would be even greater. If instructions are to be issued with National dried milk, they should be amended to recommend one level measure to 1 oz. of water, with the addition of 1 drachm of sugar to each 4 oz. of the mixture. This would largely abolish underfeeding, and it would simplify matters for mothers who are not adept at working out the figures. The rule is: half the infant's weight in pounds is the volume in ounces of a four-hourly feed and the number of level measures. Occasionally this rule may lead to what is technically overfeeding; but we have been too much afraid of this in the past, and babies can take it more readily than is generally supposed. However clear and accurate the instructions, success in following them depends on the intelligence and resourcefulness of the mother. The doctor's obligation is not ended when he has given verbal or written instructions.

When artificial feeding first became practicable the importance of vitamins was not recognised; so scurvy and rickets became very common. Nowadays we do our best to see that every child has plenty of vitamins, and it seems a slur on the medical supervision if there is even a mention of scurvy or rickets. But it may be too readily assumed that the gap between the required amount and a toxic dose is very large, and there has been little emphasis on control of dosage. The question of vitamin D is the most disquieting. Dried milks and evaporated milks contain additional vitamin D; cod-liver oil is issued free to every mother—with persuasive propaganda to make sure it is given—and other foods, such as cereals and glucose, may contain added vitamin D. Creery and Neill[4] have suggested that, in our anxiety to avoid rickets, we may be in danger of poisoning our children with vitamin D; and Ball[5] believes that over-

1. Vining, C. W. *Lancet*, 1952, ii, 99.
2. Wood, B. S. B. *Ibid*, 1952, i, 28.
3. Hytten, F. E., MacQueen, I. A. G. *Ibid*, 1954, ii, 836.
4. Creery, R. D. G., Neill, D. W. *Ibid*, p. 1124.
5. Ball, W. A. *Ibid*, p. 243.

dosage is relatively common. Even without firm proof, these warnings must not be ignored. A survey on the lines of that by Hytten and MacQueen might reveal just how much vitamin D infants really are getting; and if the intake is found greatly to exceed the requirements it should be reduced, for such excess can do no good and may be doing serious harm. Whether vitamin D is best provided in milk, as Woodcock [6] suggests, or in cod-liver oil is debatable; but it should be contained in one or the other, not both. Until we have more facts about vitamin-D intake it would be wise to assume that most babies in this country are getting more than they need; and to remember that cod-liver oil is strong stuff.

## CEREBELLAR DEGENERATION

CONFUSION over the various forms of degeneration of the cerebellum and associated tracts in the spinal cord has been partly dispelled by Greenfield.[7] There are two major pathological groups: in one the long tracts in the spinal cord are chiefly affected, and in the other the cerebellum itself. The best-known example of a predominantly spinal disorder is Friedreich's ataxia, in which the principal changes are in the dorsal columns and neighbouring parts of the lateral columns, with fairly complete degeneration of the direct, and slighter changes in the indirect, spinocerebellar tracts; there is usually some atrophy and sclerosis of Clarke's column and degeneration of the dorsal roots, especially in the lumbosacral segments. In some affected families clinical and pathological variations from typical Friedreich's ataxia are found, and rarely, in an individual patient, the disorder may be combined with a more common familial disease—peroneal muscular atrophy. The familial and usually non-progressive condition described by Roussy and Levy [8] in 1926, of which the main features are pes cavus and absent tendon reflexes in the legs, sometimes combined with slight ataxia, some wasting of the distal leg-muscles and small muscles of the hands, and extensor plantar responses, is a further link between Friedreich's ataxia and peroneal muscular atrophy; and all three conditions have been described in different members of the same family.[9]

In 1893 Marie [10] described familial cerebellar ataxia which developed slowly in adult life, and differentiated this from Friedreich's ataxia. His report was based on four families previously described by others. In some of these cases necropsy reports became available only after Marie's paper appeared, and in 1907 Gordon Holmes [11] pointed out that in the group described by Marie the lesions were not always the same. In two of the families the degenerative changes were predominantly in the spinal cord, in one the cerebellar cortex was mainly affected, and in the fourth the microscopical examination was incomplete. Greenfield has analysed all the reported cases of familial cerebellar degeneration with clinical onset in adult life in which there are satisfactory pathological reports; and he finds that they fall into two groups, in addition to the predominantly spinal cases. In the first group, originally described by Menzel in 1891,[12] the degeneration affects principally the middle-cerebellar peduncles, the pontine nuclei, the medullary olives, and the cerebellar white matter and cortex, in that order of constancy. This in fact is essentially a cerebello-petal degeneration; and it is apparently the same disorder as that described in sporadic cases by Déjerine and Thomas,[13] and called by them olivo-ponto-cerebellar atrophy because of the prominent changes in the ventral aspects of the pons and the olivary prominences. In the second familial type, described by Gordon Holmes,[14] the degeneration is cerebello-fugal; it affects mainly the paleocerebellum, and there are distinct changes in the vermis and in the parts of the inferior olives related anatomically to the degenerated areas of the cerebellar cortex. This type also has its counterpart in sporadic cases of cerebellar degeneration, and it does not differ essentially from the late cortical cerebellar atrophy described by Marie et al.[15] Despite the pathological differences between the two major types of cerebellar degeneration, clinically they are usually indistinguishable. In both there is slow and usually progressive unsteadiness in walking, followed by dysarthria and some incoördination of hand movements and rarely nystagmus. In olivo-ponto-cerebellar atrophy extrapyramidal rigidity may develop in the later stages owing to changes in the corpus striatum and substantia nigra.

The classification of these familial and sporadic degenerations of the cerebellum and its connections is not only of academic interest. As Greenfield says: "it is not at all clear what is transmitted in the hereditary ataxias"; and he suggests that it may be a deficiency in certain enzyme systems in the central nervous system. In other familial neurological diseases biochemical studies have begun to yield important results. The finding of excess copper deposition in hepatolenticular degeneration has led to treatment by the administration of dimercaprol, with improvement in some patients; more recently the reduction of phenylalamine in the diet of children with mental deficiency associated with phenylketonuria has given encouraging results [16]; and last week Mr. Trew and Dr. Fischer described new evidence of disturbed diurnal metabolic rhythm in schizophrenia.[17] There is some evidence that cerebellar degeneration may be linked with metabolic changes in the occasional association of subacute cases with visceral carcinoma. In the earlier reported cases this was thought to be a chance association; but in 1938 Brouwer and Biemond [18] suggested a causal relationship, and further reports [19 20] have supported this view. The most common malignant growth has been a carcinoma of the ovary, but in some cases there has been a bronchial carcinoma and rarely a neoplasm elsewhere. In such cases there is diffuse loss of Purkinje cells without changes in the olives or pontine nuclei; and in some there has been perivascular and meningeal lymphocytic infiltration, which Greenfield regards as secondary to the degeneration rather than in any way associated with its cause. The clinical course is usually more rapidly progressive than in the familial and sporadic degenerations, and the cerebrospinal fluid may contain an excess of lymphocytes with an increased protein content and a first-zone Lange curve.

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Sir HENRY WADE, consulting surgeon to the Edinburgh Royal Infirmary, died in Edinburgh on Monday at the age of 77.

Sir GODFREY HUGGINS, F.R.C.S., prime minister of the Federation of Rhodesia and Nyasaland, has been created a viscount.

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6. Woodcock, R. H. *Ibid*, p. 243.
7. Greenfield, J. G. The Spino-cerebellar Degenerations. Oxford, 1954. See *Lancet*, Jan. 1, 1955, p. 30.
8. Roussy, G., Levy, G. *Rev. neurol.* 1926, **1**, 427.
9. Spillane, J. D. *Brain*, 1940, **63**, 275.
10. Marie, P. *Sem. médicale*, 1893, **13**, 444.
11. Holmes, G. M. *Brain*, 1907, **30**, 545.
12. Menzel, P. *Arch. Psychiat. Nervenkr.* 1891, **22**, 160.
13. Déjerine, J., Thomas, A. *Nour. Iconogr. Salpêt.* 1900, **13**, 330.
14. Holmes, G. M. *Brain*, 1907, **30**, 466.
15. Marie, P., Foix, C., Alajouanine, T. *Rev. neurol.* 1922, **38**, 849.
16. Woolf, L. I., Griffiths, R., Moncrieff, A. *Brit. med. J.* Jan. 8, 1955, p. 57.
17. Trew, A., Fischer, R. *Lancet*, Feb. 19, 1954, p. 402
18. Brouwer, B., Biemond, A. *J. belge Neurol.* 1938, **38**, 691.
19. Brain, W. R., Daniel, P. M., Greenfield, J. G. *J. Neurol. Psychiat.* 1951, **14**, 59.
20. Henson, R. A., Russell, D. S., Wilkinson, M. *Brain*, 1954, **77**, 82.

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THE INDEX and title-page to Vol. II, 1954, which was completed with THE LANCET of Dec. 25, is published with our present issue. A copy will be sent gratis to subscribers on receipt of a postcard addressed to the Manager of THE LANCET, 7, Adam Street, Adelphi, W.C.2. Subscribers who have not already indicated their desire to receive indexes regularly as published should do so now.

# Social and Biological Factors in Infant Mortality *

## III. THE EFFECT OF MOTHER'S AGE AND PARITY ON SOCIAL-CLASS DIFFERENCES IN INFANT MORTALITY

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OF THE SOCIAL MEDICINE RESEARCH UNIT

THE principal object of the present inquiry is to examine social and biological factors in stillbirth and infant mortality, to try to disentangle their various effects, and to observe how the factors combine. In the first paper of the series,[1] the familiar variation in the stillbirth and infant-mortality rates with the social class of the father was briefly discussed; the second paper [2] then showed that these rates also varied considerably with two "biological" factors—the age and parity of the mother. It is well known, however, that professional people tend to marry later and have smaller families than, say, manual workers. The object of the present paper, therefore, is to consider the extent of such "biological" differences between the social classes, and the effect of these differences on the stillbirth and infant-mortality rates of the social classes. The variation in the mortality-rates according to the occupation of the father, or to the part of the country in which the parents lived at the time of the birth, is also considered from this point of view.

TABLE I—VARIATION IN STILLBIRTH AND INFANT-MORTALITY RATES ACCORDING TO THE SOCIAL CLASS OF THE FATHER
(Single, legitimate births in England and Wales, 1949)

| Social class | Description of occupations | Stillbirths * | Neonatal † deaths | Post-neonatal † deaths |
|---|---|---|---|---|
| I | Professional | 15·7 | 12·8 | 4·9 |
| II | Intermediate | 20·0 | 14·0 | 6·0 |
| III | Skilled | 21·1 | 16·0 | 10·6 |
| IV | Partly skilled | 22·6 | 18·4 | 14·4 |
| V | Unskilled | 25·7 | 19·2 | 17·4 |

* Per 1000 live and still births. † Per 1000 live births.
Births for which social class (or occupation) was not stated are excluded from the tables in this paper, unless otherwise indicated.

### Analysis

As before, all observations are confined to the 691,640 single, legitimate, live and still births which occurred in England and Wales in 1949, and which constituted 93% of all the births in that year. Multiple and illegitimate births present special problems which will be taken up later. It is worth noting here that the social class of the mother or the child (or the family) is the same as the social class of the husband—which, in turn, is based on his occupation.

Table I sets out the stillbirth-rates and the neonatal (first four weeks) and post-neonatal (remainder of first year) mortality-rates for each of the five social classes. The steady increase from social class I to social class V is at once apparent. The range of variation shown is considerable, particularly for post-neonatal deaths which vary from 4·9 to 17·4 per 1000 live births. As was seen in the second paper, however, the variation in the rates between mothers of different ages and parities † is also considerable: post-neonatal deaths there varied from 6·3 per 1000 live births (mothers of 25–29 having their first child) to 56·9 per 1000 (mothers of 20–24 having their fifth child), while stillbirth-rates varied even more. The question, then, is: do the differences in age and parity between mothers in the various social classes account, in themselves, for an important part of the class variation in the mortality-rates?

*The Extent of the Class Differences in Age and Parity*

To illustrate the nature and extent of such differences it is simpler, first of all, to consider two social classes only—those at either end of the social scale. Fig. 1 gives an indication of these differences, showing for example that 22% of all the mothers in social class V were under 25 and having their first birth, compared with 11% of all the mothers in social class I. If each cell in fig. 1 is assigned to one of three groups, A, B, and C, as shown in the diagram, it will be seen that A refers to those categories of age and parity where the mothers in social class V have a greater proportion of their births than the mothers in social class I; while C refers to those categories where the mothers in social class V have a smaller proportion of their births than the mothers in social class I. B is an intermediate category. A corresponds broadly to younger mothers and mothers with larger families; C corresponds to older mothers with smaller families. It can be shown that 60% of all the mothers in social class I are to be found in C, compared with only 26% of all the mothers in social class V. Those mothers married to professional men do therefore tend to have fewer children, and to have them at a later age, than the mothers married to unskilled workers. The extent of these differences is considerable and it will be seen from table II that there is a steady trend throughout the social-class scale.

| | | |
|---|---|---|
| A | C | C |
| A | B | C |
| A | A | A |

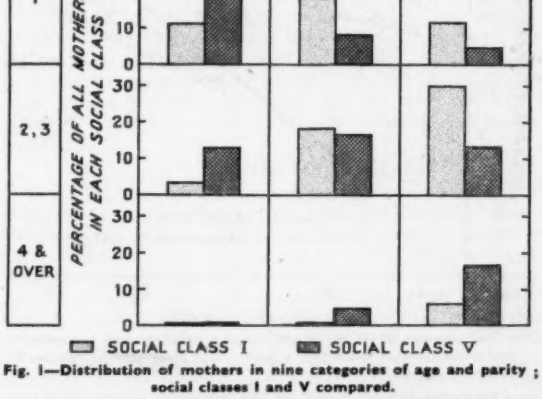


Fig. 1—Distribution of mothers in nine categories of age and parity; social classes I and V compared.

Mothers having a single, legitimate birth in England and Wales, 1949.

* A series of articles reporting an inquiry made jointly by the Social Medicine Research Unit (Medical Research Council) and the General Register Office. The articles [1 2] were prepared by the Unit in collaboration with the General Register Office, and have been approved for publication by the joint working party responsible for the inquiry.

† The parity of the mother is defined here as the number of children she has borne—surviving, dead, or stillborn—including the present one.

TABLE II—THE EXTENT OF THE SOCIAL-CLASS DIFFERENCES IN AGE AND PARITY

(Single, legitimate births in England and Wales, 1949)

| Age-parity group* | Description of mothers | Social class | | | | |
|---|---|---|---|---|---|---|
| | | I | II | III | IV | V |
| A | Younger, higher parity | 22% | 30% | 44% | 54% | 57% |
| B | Intermediate | 18% | 18% | 19% | 17% | 17% |
| C | Older, lower parity | 60% | 52% | 37% | 29% | 26% |
| All mothers .. .. .. | | 100% | 100% | 100% | 100% | 100% |

* For description of groups see text.

It is therefore necessary to "*standardise*" (or "adjust") the social-class stillbirth and infant-mortality rates for both mothers' age and parity (just as it is necessary to standardise the death-rates of two towns for age and sex, for example, where any comparison would otherwise be invalidated because the populations of the two towns differ in respect of these attributes). This has been done by the "direct" method, taking as the "standard population" all single, legitimate, live and still births in England and Wales in 1949. That is, in each social class, stillbirth and neonatal and post-neonatal mortality-rates were calculated for each of 56 age-parity categories ‡; then, using the proportions of the standard population in these 56 categories as "weights," standardised rates were calculated as the weighted means of the 56 rates in each social class.

*The Effects of the Differences*

The results of this procedure are presented in table III and fig. 2, and a comparison made with the crude or unstandardised rates. It is at once apparent that social-class differences in age and parity have had little effect on the social-class gradients of the mortality-rates. Standardisation has accentuated slightly the gradient for stillbirths, diminished slightly the gradient for post-neonatal deaths, and scarcely affected that for neonatal deaths.

Stillbirth rates have previously been corrected for age and parity by other workers using similar methods.[3 5 6] Their conclusions are confirmed by the present findings which, in addition, extend them to neonatal and post-neonatal mortality-rates. Thus, although fig. 2 indicates that social-class differences in age and parity have a rather larger effect on post-neonatal mortality-rates than on stillbirth rates, McKinlay's conclusions are still equally applicable to all three rates: "The explanation of the social class differences [in fœtal wastage] is to be looked for elsewhere than in the class differences of parturients with respect to age and [previous] parity."

TABLE III—VARIATION IN STILLBIRTH AND INFANT-MORTALITY RATES ACCORDING TO THE SOCIAL CLASS OF THE FATHER: BEFORE AND AFTER STANDARDISATION FOR MOTHER'S AGE AND PARITY

(Single, legitimate births in England and Wales, 1949)

| Social class | Description of occupations | Stillbirths* | | Neonatal† deaths | | Post-neonatal† deaths | |
|---|---|---|---|---|---|---|---|
| | | Crude | Standardised | Crude | Standardised | Crude | Standardised |
| I | Professional | 15·7 | 14·3 | 12·8 | 13·3 | 4·9 | 5·4 |
| II | Intermediate | 20·0 | 18·9 | 14·0 | 14·1 | 6·0 | 6·7 |
| III | Skilled | 21·1 | 21·5 | 16·0 | 16·1 | 10·6 | 10·7 |
| IV | Partly skilled | 22·6 | 23·2 | 18·4 | 18·2 | 14·4 | 13·3 |
| V | Unskilled | 25·7 | 26·0 | 19·2 | 19·0 | 17·4 | 15·8 |
| All classes‡ .. .. | | 21·5 | | 16·4 | | 11·1 | |

* Per 1000 live and still births.
† Per 1000 live births.
‡ These rates are based on all births, including those where social class was not stated.

It is interesting to consider why standardisation has had such little effect—in view of the fact that the three mortality-rates vary considerably with mother's age and parity, and the various social classes also differ considerably with respect to both of these factors, so that quite substantial changes with standardisation might well have been expected. An important reason for this is the fact that only a very small proportion of mothers are exposed to the high mortality risks occasioned by an unfavourable age or parity. It was pointed out in the second paper [2] that babies of the younger mothers with large families for their age have a high risk of death in the post-neonatal period. But if this group is taken here to be second or later births to mothers aged 16–19, third or later births to mothers aged 20–24, and also fifth or later births to mothers aged 25–29, it is found that these births constitute only 3·7% of all live births in 1949. Similarly, mothers over 35 bearing their first baby, and all mothers over 40, have a high risk of stillbirth. But the number of births to these mothers was only 5·8% of all births in 1949. It will be seen, therefore, that although there appears to be a very great range of variation in the mortality-rates when mothers of different ages and parities are considered, the overwhelming majority of mothers are not affected by the extreme rates. Only if the above proportions had been increased five-fold, at least, would standardisation for age and parity have had any marked effect.

Since the grouping of occupations into broad social classes is bound, in itself, to reduce the range of variation of the mortality-rates, it is interesting to examine the effects of standardisation on the rates for those occupational groups shown in table IV. It will be seen that the differences between the crude and standardised rates are,

‡ The 56 age-parity categories were obtained by considering:
(1) Mothers aged 16–19, 20–24, 25–29, 30–34, 35–39, 40–44, 45 and over, and "age not stated."
(2) Mothers of parity 1, 2, 3, 4, 5, 6 and over, and "parity not stated."

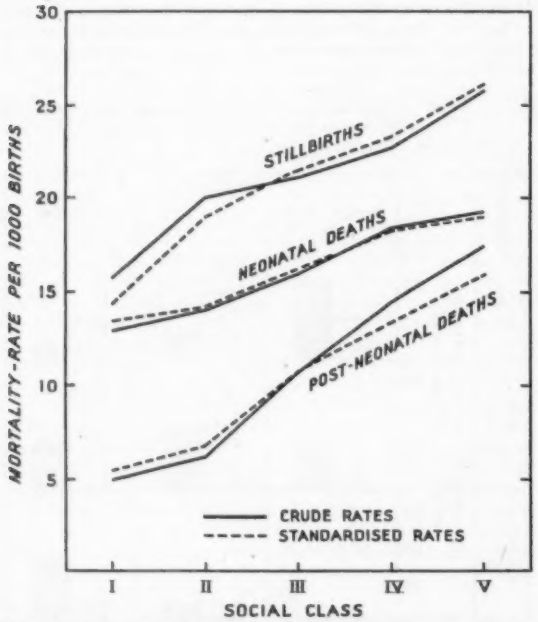


**Fig. 2—Variation in stillbirth and infant-mortality rates according to the social class of the father: before and after standardisation for mother's age and parity.**

Single, legitimate births in England and Wales, 1949.
Stillbirth-rates, per 1000 live and still births; other rates, per 1000 live births.

proportionately, rather greater than for social classes, and once again the post-neonatal mortality-rates are most affected. The greatest individual change concerns "senior clerical workers"—costing clerks and bank clerks, for example—where the standardised post-neonatal mortality-rate of 6·7 per 1000 live births is 29% greater than the corresponding crude rate of 5·2 per 1000. When it is realised, however, that the children of "mineworkers (coal) in class IV"—that is, the semi-skilled workers—have a crude post-neonatal mortality-rate almost five times as high as this, it is clear that age and parity differences between the wives of men in these occupational groups play little part in accounting for the large differences in the mortality-rates of their children.

Fig. 3—The ten "standard regions" of England and Wales.

Different parts of the country, it is well known, have a different stillbirth and infant-mortality experience, and table v sets out the relevant rates—before and after standardisation—for the ten "standard regions" of England and Wales shown in fig. 3. Most of the crude rates presented in this table are hardly affected by standardisation; the greatest individual change is for the post-neonatal mortality-rate in the Northern region—and here the standardised rate is only 5% less than the crude rate. Since the crude post-neonatal mortality-rate for the Eastern region is less than half the crude rate for the Northern region, it is easy to conclude that the differences in the regional rates must certainly be ascribed to causes other than any tendency there may be for mothers in the various regions to differ in respect of age and parity. This means, for instance, that we cannot attribute the traditionally high stillbirth-rate in Wales to differences in age or family size between mothers in Wales and mothers in England.

TABLE IV—VARIATION IN STILLBIRTH AND INFANT-MORTALITY RATES ACCORDING TO THE OCCUPATION OF THE FATHER: BEFORE AND AFTER STANDARDISATION FOR MOTHER'S AGE AND PARITY

(Single, legitimate births in England and Wales, 1949)

| Social class | Occupation | Stillbirths* | | Neonatal† deaths | | Post-neonatal† deaths | |
|---|---|---|---|---|---|---|---|
| | | Crude | Standardised | Crude | Standardised | Crude | Standardised |
| I | Professional workers .. | 15·7 | 14·3 | 12·8 | 13·3 | 4·9 | 5·4 |
| II | Farmers .. .. .. | 23·8 | 22·4 | 14·4 | 14·0 | 7·6 | 7·4 |
| | Senior clerical workers .. | 16·9 | 16·2 | 11·6 | 11·6 | 5·2 | 6·7 |
| | All others in social class II | 19·7 | 18·5 | 14·4 | 14·5 | 5·9 | 6·7 |
| III | Coal hewers and getters .. | 25·8 | 26·0 | 19·5 | 20·5 | 19·9 | 17·2 |
| | Transport workers .. | 21·9 | 22·3 | 17·4 | 17·6 | 11·4 | 11·0 |
| | Clerical workers .. .. | 20·8 | 20·6 | 13·7 | 14·0 | 6·3 | 7·8 |
| | Armed Forces .. .. | 18·3 | 20·4 | 16·4 | 16·2 | 11·7 | 10·4 |
| | All others in social class III | 20·9 | 21·2 | 15·7 | 15·8 | 10·2 | 10·4 |
| IV | Agricultural workers .. | 19·5 | 19·2 | 16·9 | 16·5 | 9·5 | 8·7 |
| | Mineworkers (coal) in social class IV .. .. .. | 22·5 | 23·8 | 23·4 | 22·7 | 23·9 | 21·3 |
| | All others in social class IV | 23·7 | 24·5 | 17·7 | 17·8 | 13·9 | 13·1 |
| V | Building labourers .. | 23·5 | 24·4 | 18·9 | 19·0 | 20·0 | 18·1 |
| | Dock labourers .. .. | 29·9 | 27·4 | 17·2 | 16·1 | 18·1 | 14·5 |
| | All others in social class V.. | 26·1 | 26·4 | 19·5 | 19·1 | 16·6 | 15·2 |

* Per 1000 live and still births. † Per 1000 live births.

Transport workers, clerical workers, Armed Forces, and agricultural workers are occupations defined by the General Register Office "as "functional subdivisions" of the social classes. The other occupations listed above, where not otherwise obvious, are defined by the following code numbers: farmers (010, 011, 020); senior clerical workers (611, 612, 895); coal hewers and getters (041, 042); building labourers (582, 584, 586, 591, 599); dock labourers (681).

TABLE V—VARIATION IN STILLBIRTH AND INFANT-MORTALITY RATES ACCORDING TO THE PART OF THE COUNTRY IN WHICH THE PARENTS LIVED AT THE TIME OF THE BIRTH: BEFORE AND AFTER STANDARDISATION FOR MOTHER'S AGE AND PARITY

(Single, legitimate births in England and Wales, 1949)

| Standard regions | Stillbirths* | | Neonatal† deaths | | Post-neonatal† deaths | |
|---|---|---|---|---|---|---|
| | Crude | Standardised | Crude | Standardised | Crude | Standardised |
| Northern .. .. | 23·4 | 23·6 | 18·5 | 18·4 | 17·9 | 17·0 |
| East and West Ridings | 22·0 | 21·9 | 17·6 | 17·6 | 12·9 | 12·7 |
| North Western .. | 24·3 | 24·3 | 17·8 | 17·8 | 14·7 | 14·6 |
| North Midland .. | 21·0 | 21·1 | 15·9 | 16·0 | 11·6 | 11·3 |
| Midland .. .. | 22·0 | 22·0 | 16·7 | 16·7 | 12·3 | 12·0 |
| Eastern .. .. | 19·8 | 20·0 | 13·7 | 13·8 | 7·0 | 7·0 |
| London and South-East | 18·7 | 18·6 | 14·3 | 14·4 | 7·6 | 7·9 |
| Southern .. .. | 18·2 | 18·5 | 14·8 | 14·8 | 7·1 | 7·1 |
| South-Western .. | 21·1 | 21·3 | 17·3 | 17·4 | 7·9 | 7·9 |
| Wales .. .. .. | 27·0 | 26·8 | 19·3 | 19·2 | 14·0 | 13·5 |

* Per 1000 live and still births. † Per 1000 live births.

## Comment

The present analysis shows that it would be wrong to attribute any important part of the social-class, occupational, and regional differences in the stillbirth and infant-mortality rates of England and Wales to differences in the ages and parities of the mothers concerned. This raises the question of the independence of action of the factor of social class (or occupation, or region) and the factors of age and parity. For instance: is a social-class effect present whenever a group of mothers of a particular age and a particular parity is considered; or conversely, is an age-parity effect present whenever mothers in a particular social class are considered? That independence of action (as thus defined) does indeed exist will be demonstrated in the next paper of this series.

Finally, it is worth pointing out that the above results should not be taken to mean that age and parity need never be considered in any discussion of "social" effects. Differences in age and parity may well be important, for instance, in any comparison of legitimate and illegitimate mortality-rates (since illegitimate births are so frequently first births to young mothers), and in comparisons of countries which have substantially different age-parity patterns.

## Summary

It is shown that there were considerable differences between the social classes in the ages and parities of those mothers who had a single, legitimate birth in England and Wales in 1949. It is then demonstrated, however, that the explanation of the variation between the classes in the stillbirth-rate, the neonatal (first four weeks of life) mortality-rate, and the post-neonatal (remainder of first year of life) mortality-rate must be looked for elsewhere than in these age and parity differences. Similar conclusions are reached in the case of differences in the mortality-rates when analysed according to the occupation of the father, or according to the region of England

and Wales in which the parents lived at the time of the birth.

We are grateful to the staff of the General Register Office for professional, technical and computing help; to colleagues for criticism and advice, particularly to Mr. C. F. Stevens; and to the staff of the Social Medicine Research Unit for clerical and computing work.

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CORRIGENDUM—In the last compartment of fig. 1 of paper II in this series (*Lancet*, Feb. 19, p. 395) the figure for Parity 1 should be where "2, 3" are at present; and vice versa.

# Special Articles

## CONSULTANT AND OTHER SPECIALIST STAFF IN HOSPITALS

THE accompanying tables have been issued by the Ministry of Health and Department of Health for Scotland as being of interest to the medical profession generally, and especially perhaps to those intending to train as specialists. All the figures relate to National Health Service hospitals in Great Britain.

TABLE III—NUMBER OF SENIOR REGISTRARS IN EACH SPECIALTY IN 1954 (GREAT BRITAIN)

| Specialty | Training plan | | | | | Others | Grand total |
|---|---|---|---|---|---|---|---|
| | 1st yr. | 2nd yr. | 3rd yr. | 4th yr. | Total | | |
| General medicine .. | 44 | 33 | 25 | 22 | 124 | 77 | 201 |
| Diseases of the chest .. | 24 | 18 | 4 | 9 | 55 | 10 | 65 |
| Mental health .. .. | 51 | 29 | 12 | 10 | 102 | 27 | 129 |
| Neurology .. .. | 3 | 3 | 5 | 4 | 15 | 4 | 19 |
| Paediatrics .. .. | 11 | 5 | 7 | 1 | 24 | 17 | 41 |
| Radiology .. .. | 28 | 21 | 8 | 4 | 61 | 1 | 62 |
| Radiotherapy .. .. | 5 | 7 | 2 | 3 | 17 | 2 | 19 |
| Physical medicine .. | 4 | 3 | 2 | 1 | 10 | 2 | 12 |
| Pathology .. .. | 21 | 21 | 14 | 7 | 63 | 27 | 90 |
| Infectious diseases .. | 2 | 2 | .. | .. | 4 | 3 | 7 |
| Dermatology .. .. | 2 | 6 | 6 | 8 | 22 | 10 | 32 |
| Venereology .. .. | 3 | 1 | .. | 1 | 5 | 4 | 9 |
| Ophthalmology .. | 12 | 14 | 9 | 11 | 46 | 11 | 57 |
| General surgery .. | 50 | 40 | 24 | 20 | 134 | 69 | 203 |
| Anæsthetics .. .. | 31 | 15 | 12 | 1 | 59 | 8 | 67 |
| Neurosurgery .. .. | 2 | 5 | .. | 5 | 12 | 5 | 17 |
| Plastic surgery .. | 2 | 2 | 6 | 4 | 14 | 3 | 17 |
| Thoracic surgery .. | 8 | 3 | 3 | 4 | 18 | 12 | 30 |
| Orthopædic surgery .. | 13 | 14 | 13 | 10 | 50 | 22 | 72 |
| Ear, nose, and throat surgery .. .. | 13 | 12 | 8 | 2 | 35 | 13 | 48 |
| Obstetrics and gynæcology .. .. | 26 | 15 | 17 | 13 | 71 | 35 | 106 |
| Others .. .. .. | 1 | .. | .. | 1 | 2 | 1 | 3 |
| Totals .. .. | 356 | 269 | 177 | 141 | 943 | 363* | 1306* |

* Includes 61 honorary and 41 part-time senior registrars.

Table I shows the age-distribution in 1954 of consultants and senior hospital medical officers practising in the various specialties. (Some, especially those in the

TABLE I—AGE-DISTRIBUTION IN 1954 OF CONSULTANTS AND S.H.M.O.S IN EACH SPECIALTY (GREAT BRITAIN)

| Year of birth | Specialty | | | | | | | | | | | | | | | | | | | | | | Year of birth |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | General medicine | Diseases of the chest | Mental health | Neurology | Paediatrics | Radiology | Radiotherapy | Physical medicine | Pathology | Infectious diseases | Dermatology | Venereology | Ophthalmology | General surgery | Anæsthetics | Neurosurgery | Plastic surgery | Thoracic surgery | Orthopædic surgery | Ear, nose, and throat surgery | Obstetrics and gynæcology | Miscellaneous | Totals | |
| 1883 | .. | .. | .. | .. | .. | .. | .. | .. | 1 | .. | .. | .. | .. | 1 | .. | .. | .. | .. | .. | .. | .. | .. | 2 | 1883 |
| 1884 | 1 | .. | .. | .. | .. | .. | .. | .. | 1 | .. | .. | 1 | 1 | 1 | 1 | .. | .. | .. | .. | .. | .. | .. | 6 | 1884 |
| 1885 | 1 | .. | .. | 2 | .. | .. | .. | .. | .. | .. | .. | .. | .. | 5 | .. | .. | .. | .. | 1 | 1 | .. | .. | 10 | 1885 |
| 1886 | 2 | .. | .. | .. | 3 | .. | .. | .. | 2 | .. | .. | .. | 1 | 3 | 1 | .. | .. | .. | 1 | 1 | .. | .. | 14 | 1886 |
| 1887 | 1 | .. | 1 | .. | .. | .. | .. | 1 | 2 | .. | .. | 1 | 5 | 3 | .. | .. | .. | .. | 1 | 2 | .. | .. | 17 | 1887 |
| 1888 | 7 | 6 | 1 | 1 | 1 | 5 | .. | .. | 7 | 2 | .. | 2 | 2 | 1 | 2 | .. | .. | .. | 1 | 2 | 3 | .. | 43 | 1888 |
| 1889 | 11 | 5 | 2 | .. | .. | 9 | .. | .. | 8 | 2 | 1 | 2 | 6 | 17 | 4 | 1 | .. | 1 | 3 | 5 | 8 | .. | 85 | 1889 |
| 1890 | 13 | 2 | 15 | 3 | 1 | 6 | 1 | 1 | 6 | 1 | 5 | 1 | 3 | 16 | 8 | 1 | 1 | 1 | 4 | 5 | 5 | .. | 99 | 1890 |
| 1891 | 18 | 2 | 3 | .. | 2 | 8 | 1 | 1 | 9 | 3 | 3 | 3 | 7 | 23 | 2 | .. | .. | .. | 3 | 4 | 11 | .. | 103 | 1891 |
| 1892 | 11 | 9 | 9 | .. | 8 | 10 | .. | 3 | 6 | 3 | 3 | 3 | 11 | 20 | 8 | .. | .. | .. | 5 | 8 | 7 | .. | 124 | 1892 |
| 1893 | 24 | 7 | 10 | 1 | 3 | 11 | 2 | .. | 7 | 4 | 3 | 3 | 17 | 24 | 12 | .. | .. | 2 | 1 | 7 | 6 | .. | 144 | 1893 |
| 1894 | 15 | 9 | 13 | .. | 2 | 8 | .. | .. | 12 | 5 | 7 | 6 | 15 | 23 | 13 | .. | .. | .. | 4 | 8 | 10 | 1 | 151 | 1894 |
| 1895 | 20 | 12 | 13 | 1 | 3 | 11 | .. | 1 | 18 | 5 | 1 | 2 | 10 | 22 | 15 | .. | .. | 1 | 2 | 9 | 11 | .. | 157 | 1895 |
| 1896 | 23 | 8 | 19 | 1 | 5 | 11 | 3 | 1 | 16 | 5 | 8 | 7 | 15 | 28 | 26 | .. | 1 | 1 | 4 | 13 | 10 | .. | 205 | 1896 |
| 1897 | 32 | 11 | 27 | 1 | 4 | 14 | 3 | 2 | 14 | 3 | 6 | 7 | 11 | 37 | 29 | 2 | .. | 1 | 7 | 12 | 13 | .. | 236 | 1897 |
| 1898 | 31 | 10 | 30 | .. | 6 | 17 | 3 | 1 | 14 | 6 | 9 | 7 | 24 | 27 | 25 | .. | .. | .. | 4 | 11 | 21 | .. | 246 | 1898 |
| 1899 | 27 | 16 | 35 | 4 | 2 | 17 | 7 | 8 | 24 | 6 | 6 | 4 | 30 | 50 | 32 | 1 | .. | .. | 7 | 12 | 17 | .. | 305 | 1899 |
| 1900 | 48 | 24 | 42 | 2 | 10 | 14 | 4 | 3 | 17 | 11 | 11 | 8 | 28 | 51 | 45 | 3 | 1 | 1 | 16 | 22 | 16 | .. | 377 | 1900 |
| 1901 | 41 | 20 | 34 | .. | 5 | 21 | 4 | 3 | 18 | 13 | 8 | 6 | 29 | 42 | 37 | .. | 2 | 1 | 10 | 26 | 19 | .. | 339 | 1901 |
| 1902 | 29 | 32 | 34 | 5 | 12 | 12 | 3 | 3 | 10 | 5 | 1 | 10 | 21 | 54 | 42 | 3 | 3 | 4 | 14 | 19 | 24 | .. | 340 | 1902 |
| 1903 | 38 | 27 | 30 | 5 | 6 | 11 | 3 | 2 | 22 | 5 | 7 | 5 | 18 | 49 | 38 | .. | 2 | 4 | 12 | 9 | 23 | .. | 316 | 1903 |
| 1904 | 40 | 21 | 32 | 3 | 5 | 10 | 4 | 2 | 17 | 4 | 5 | 5 | 14 | 57 | 29 | 1 | 1 | .. | 11 | 14 | 21 | .. | 296 | 1904 |
| 1905 | 35 | 26 | 42 | 1 | 6 | 13 | 3 | .. | 25 | 1 | 5 | 11 | 23 | 38 | 32 | 1 | 1 | 3 | 8 | 10 | 18 | .. | 302 | 1905 |
| 1906 | 37 | 20 | 42 | 1 | 7 | 11 | 3 | 6 | 22 | 5 | 6 | 5 | 12 | 47 | 36 | 3 | 1 | 2 | 12 | 13 | 18 | .. | 309 | 1906 |
| 1907 | 63 | 27 | 38 | 6 | 11 | 10 | 2 | 3 | 29 | 4 | 9 | 6 | 16 | 38 | 27 | 1 | 4 | 3 | 25 | 12 | 26 | .. | 360 | 1907 |
| 1908 | 43 | 20 | 40 | 4 | 11 | 10 | 6 | 3 | 22 | 5 | 8 | 6 | 19 | 46 | 41 | 2 | 3 | 3 | 19 | 12 | 18 | .. | 341 | 1908 |
| 1909 | 49 | 22 | 31 | 6 | 14 | 13 | 3 | 3 | 27 | 3 | 4 | 4 | 22 | 39 | 33 | 4 | 2 | 3 | 22 | 15 | 28 | .. | 347 | 1909 |
| 1910 | 52 | 26 | 39 | 2 | 15 | 20 | 5 | 3 | 35 | 2 | 10 | 9 | 24 | 68 | 32 | 3 | 1 | 4 | 22 | 13 | 27 | .. | 412 | 1910 |
| 1911 | 49 | 42 | 43 | 2 | 7 | 14 | 9 | 4 | 30 | 5 | 8 | 8 | 18 | 47 | 38 | 1 | 5 | 6 | 23 | 16 | 31 | .. | 406 | 1911 |
| 1912 | 45 | 23 | 46 | 2 | 11 | 28 | 4 | .. | 43 | 5 | 8 | 4 | 13 | 50 | 41 | 2 | 2 | 6 | 19 | 10 | 34 | .. | 396 | 1912 |
| 1913 | 52 | 42 | 39 | 3 | 9 | 25 | 11 | 5 | 35 | 4 | 8 | 5 | 18 | 57 | 46 | 5 | 2 | 4 | 24 | 14 | 32 | .. | 440 | 1913 |
| 1914 | 55 | 41 | 46 | 2 | 10 | 29 | 12 | 4 | 49 | 5 | 8 | 7 | 23 | 50 | 46 | 2 | 1 | 7 | 18 | 10 | 29 | .. | 454 | 1914 |
| 1915 | 60 | 44 | 48 | 5 | 14 | 26 | 4 | 7 | 49 | 2 | 8 | 7 | 24 | 34 | 60 | 4 | 6 | 6 | 29 | 14 | 30 | .. | 481 | 1915 |
| 1916 | 52 | 53 | 42 | 3 | 17 | 31 | 6 | 5 | 41 | 5 | 5 | 3 | 22 | 47 | 49 | 4 | 2 | 6 | 19 | 13 | 21 | .. | 446 | 1916 |
| 1917 | 34 | 28 | 36 | 4 | 13 | 17 | 11 | 4 | 41 | 1 | 1 | 3 | 22 | 29 | 55 | 2 | 3 | 8 | 17 | 12 | 17 | .. | 358 | 1917 |
| 1918 | 20 | 33 | 24 | .. | 16 | 18 | 10 | 10 | 35 | 1 | 12 | 2 | 14 | 20 | 38 | .. | 2 | 6 | 9 | 10 | 11 | .. | 291 | 1918 |
| 1919 | 28 | 22 | 28 | 2 | 6 | 20 | 9 | 3 | 32 | 1 | 7 | 2 | 13 | 14 | 24 | 2 | .. | 2 | 8 | 9 | 9 | 1 | 242 | 1919 |
| 1920 | 19 | 24 | 31 | .. | 4 | 14 | 4 | 1 | 33 | .. | 4 | 4 | 8 | 8 | 40 | 1 | .. | 2 | 4 | 3 | 4 | .. | 208 | 1920 |
| 1921 | 5 | 17 | 10 | .. | 1 | 13 | 4 | 1 | 18 | 1 | 1 | 2 | 9 | 2 | 28 | .. | .. | 3 | 2 | 7 | 2 | .. | 126 | 1921 |
| 1922 | 3 | 13 | 15 | 1 | 1 | 7 | 5 | .. | 7 | 2 | .. | .. | 8 | .. | 27 | .. | .. | 1 | .. | 3 | .. | .. | 93 | 1922 |
| 1923 | 1 | 8 | 7 | .. | .. | 4 | 1 | 1 | 4 | .. | .. | 1 | 8 | .. | 11 | .. | .. | .. | .. | 1 | .. | .. | 47 | 1923 |
| 1924 | 3 | 1 | .. | .. | .. | .. | 1 | .. | 2 | .. | .. | .. | 5 | .. | 7 | .. | .. | .. | .. | .. | .. | .. | 19 | 1924 |
| 1925 | 1 | 2 | 2 | .. | .. | .. | .. | .. | .. | .. | .. | .. | 3 | 1 | 1 | .. | .. | .. | .. | .. | .. | .. | 10 | 1925 |
| 1926 | .. | 1 | 1 | .. | .. | .. | .. | .. | .. | .. | .. | .. | 1 | .. | 1 | .. | .. | .. | .. | .. | .. | .. | 4 | 1926 |
| 1927 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 1 | .. | .. | .. | .. | .. | .. | .. | .. | .. | 1 | 1927 |
| Totals | 1139 | 756 | 1000 | 73 | 248 | 521 | 151 | 95 | 810 | 135 | 196 | 172 | 594 | 1189 | 1082 | 49 | 46 | 92 | 391 | 387 | 580 | 2 | 9708 | Totals |

Consultants and S.H.M.O.S practising in more than one specialty have been included under each.

TABLE II—NUMBERS OF CONSULTANTS IN EACH SPECIALTY AT VARIOUS DATES SINCE DEC. 31, 1949 (GREAT BRITAIN)

| Date | Specialty | | | | | | | | | | | | | | | | | | | | | Totals | Date |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | General medicine | Diseases of the chest | Mental health | Neurology | Paediatrics | Radiology | Radiotherapy | Physical medicine | Pathology | Infectious diseases | Dermatology | Venereology | Ophthalmology | General surgery | Anaesthetics | Neurosurgery | Plastic surgery | Thoracic surgery | Orthopaedic surgery | Ear, nose, and throat surgery | Obstetrics and gynaecology | | |
| Dec. 31, 1949 | 755 | 216 | 449 | 53 | 166 | 327 | 85 | 49 | 495 | 50 | 127 | 89 | 331 | 927 | 496 | 37 | 30 | 49 | 252 | 312 | 424 | 5719 | Dec. 31, 1949 |
| Dec. 31, 1950 | 831 | 250 | 504 | 53 | 202 | 378 | 93 | 57 | 526 | 52 | 136 | 101 | 341 | 943 | 602 | 39 | 32 | 57 | 269 | 328 | 439 | 6233 | Dec. 31, 1950 |
| Dec. 31, 1951 | 857 | 266 | 532 | 59 | 208 | 400 | 101 | 61 | 541 | 48 | 135 | 99 | 342 | 948 | 655 | 42 | 33 | 66 | 293 | 341 | 449 | 6476 | Dec. 31, 1951 |
| Dec. 31, 1952 | 904 | 310 | 566 | 61 | 214 | 414 | 108 | 70 | 581 | 51 | 142 | 97 | 351 | 986 | 714 | 44 | 36 | 81 | 320 | 339 | 473 | 6862 | Dec. 31, 1952 |
| Dec. 31, 1953 | 905 | 340 | 595 | 67 | 222 | 436 | 112 | 75 | 631 | 60 | 145 | 94 | 342 | 982 | 748 | 46 | 43 | 89 | 328 | 346 | 473 | 7079 | Dec. 31, 1953 |
| June 30, 1954 | 916 | 341 | 600 | 66 | 225 | 439 | 113 | 74 | 634 | 59 | 147 | 93 | 338 | 986 | 767 | 48 | 45 | 90 | 330 | 348 | 477 | 7136 | June 30, 1954 |

Consultants practising in more than one specialty have been included under each.

older age-groups, have contracts for only a small number of sessions and it therefore does not follow that each retirement will provide a vacancy for a new recruit.)

Table II shows the increase in the number of consultants in each of the specialties between the end of 1949 and June 30, 1954. The corresponding figures for senior hospital medical officers are not available.

Table III shows the number of senior registrars in each specialty in 1954 at the various stages of their training. The column headed "Others" includes those holding "transitional" posts.

## TEACHING MENTAL HEALTH

### Discussion by the Royal Medico-Psychological Association

ALL agree that the time has come to dispel the old half-superstitious dread of mental illness, to overcome fear and prejudice about mental hospitals, and to teach a few straightforward principles of mental hygiene. But when the Royal Medico-Psychological Association met, on Feb. 17, to discuss the education of the general public in mental health, it was instructive to see how differently well-informed people could view this field of work. While some speakers examined the foreground with unaided eye, others seemed to be looking through telescopes pointed in all directions. Miss PAT HORNSBY-SMITH, M.P., parliamentary secretary to the Ministry of Health, belonged to the first group. We tend to ignore, she said, the amazing ignorance of the public about the sick mind and the work of the mental hospitals. The Government must have public support in order to spend money on a mental-health programme; it cannot spend money successfully unless staff can be attracted to the service, and the service cannot reduce acute mental illness unless patients can be persuaded to come early for treatment. The public must be helped to understand that nursing the sick mind is as important as nursing the sick body, and to recognise the dramatic change which has come about in prospects of recovery for the mentally ill. Few know that nearly 70% of those admitted to mental hospitals are nowadays voluntary patients, or that the annual turnover of patients is now about 40%. They do not distinguish between the mentally ill and the mentally defective or between the psychotic and the neurotic, and their ideas of mental hospitals are still apt to be coloured by the terms "padded cells" and "being put away." Psychiatrists, she suggested, whether through fear or foible, are reluctant to write or speak to the general public in simple terms about these things. The moment they use words which everyone can understand, they start looking over their own shoulders, and wondering what their colleagues will think of them. Yet it is much better that those who know should tell the facts about mental illness, and explain that mental hospitals are not places where people are shut up but where they are treated. Nothing but good, she urged, can come of holding "open days" at mental hospitals: "bring in the unconverted, bring in talkative public opinion." Once these critics have seen for themselves that things are much better then they expected, they will go and talk about it to others. The press and the British Broadcasting Corporation can play a vital part, she thinks, if they are given skilled guidance by the medical profession. Local programmes, arranged by the local authorities and bringing in voluntary bodies and the general public, can foster the interest in mental health which is growing all over the country. Study groups should be set up and lectures given by psychiatrists. We shall not be able to attract enough nurses "until we have the press, the public, and the parents with us"; and the way to win them over is to let them in to see the mental hospitals. We must also, she said, convince some of the old-fashioned members of the nursing profession that mental nursing is just as important as general nursing: the mental nurse must have a higher status in her own profession. She reminded the meeting that despite shortage of buildings, shortage of staff, and overcrowding we are still ahead of most other nations in our care of the mentally sick: we must keep that lead.

Dr. R. R. BOMFORD, who had been asked to speak as a "non-psychiatric doctor," made it clear that there was an opportunity for mental-health education not only in his group but among psychiatrists too. "Have you the knowledge," he asked his psychiatric colleagues, "to prevent mental ill health?" Drains, clean water, and better houses, we know, have done much to prevent physical ill health. What are the equivalents for mental hygiene? Again, what is psychiatry and what is a psychiatrist? There are so many different methods in psychiatry that the non-psychiatric doctor is apt to be puzzled; and many of the exponents of these methods seem to confuse theory with verified fact. What sort of evidence is to be accepted? Uncritical acceptance of psychiatric theories is dangerous, and uncritical abuse of them is irrational. The concept that "conflict causes disease" is an oversimplification. No illness has a single cause: most physicians are well aware of the effects of emotion in patients, and know that certain illnesses are more liable to develop in people of a given temperament or a given physique, and that any illness is affected by the patient's emotional and social circumstances. The evidence that an illness can be "caused by a conflict" is not, Dr. Bomford thinks, satisfactory. As long as the non-psychiatric doctor continues to abuse, and the psychiatrist continues to lecture, we shall not,

he thinks, get very far. They must examine and elucidate their differences of outlook. The younger generation of doctors are showing an interest in the subject, and time will bring about an understanding.

Dr. W. S. MACLAY fortified Dr. Bomford's misgivings. In teaching mental health, he said, we should be on firmer ground if we knew what we wanted to teach. "Tell us what to do, and we'll do it," the public, the health administrators, and the politicians all cry to the psychiatrist; but he does not know. He knows that people are influenced by their upbringing; but what is a proper upbringing? The anthropologists tell us of some cultures in which upbringing produces a peace-loving people, and others in which the upbringing produces people who are warlike and aggressive. Which is "right"? Or how does one achieve a happy mixture of the two? Our programme for mental health contains various practical measures. We want to provide enough mental-hospital beds, early diagnosis and treatment for individuals, the means for rehabilitation of patients leaving hospital (links with the local authorities and voluntary organisations), and consultative services (available to courts, resettlement units, remand homes, and the like). We also want to prevent those mental disorders where the ætiology is clear—by means of better obstetrics, better control of venereal disease, control of infections with antibiotics, good nutrition (to prevent those mental disorders, such as pellagra, which are caused by nutritional deficiencies), and even the wider use of crash helmets and the better control of boxing-matches. When it comes to preventing mental disorders with psychological causes we need far more information than we have at present. We need to know, for instance, more about the effects on children of cruelty, broken homes, lack of affection, and separation from parents. In the education of the public, teachers, social workers, and clergy may be more important than psychiatrists: the wives of psychiatrists, he had noticed, have on the whole very little respect for their husband's views on the upbringing of children. Will it be useful to try to influence the public through radio, television, lectures, discussion groups, plays, and films? Can behaviour (which may be deeply rooted in the personality) be readily changed through these channels? We need more research into educational methods. We also need a much fuller study of sound mental health, to determine which infants need cuddling, which schoolboys will benefit from a beating, which adults need marriage guidance, and so on. "Mental health" cannot be applied to a vague mass, "the public," but only to individuals, based on respect and affection.

Mr. FRANÇOIS LAFITTE, who owned himself to be both non-psychiatric and non-doctor, shared Dr. Maclay's pessimism about using the press and other media for mass education. The first thing surely, he said, is to get over some simple facts—the psychiatrists to decide which. The press is a part of the public which needs educating, and on the whole journalists are receptive and intelligent: what they need are opportunities to see for themselves what mental hospitals are doing. Films and broadcasting, however, are likely to have a more lasting influence on the general public than newspapers. There is a danger that by harping too much on hospital beds and curative treatment we may create in the public a new demand for psychiatry—an appetite for treatment—which we might not be able to meet. He suggested that we might do better by emphasising the factors making for good mental health—such as sensible child management and harmonious marriage relations. Is there a case, he asked, for teaching simple psychology in schools? The public are semi-ignorant about the body and still more ignorant about the mind: might not both have a place in the school curriculum?

In the ensuing discussion Dr. J. FFOULKES EDWARDS felt we might be optimistic about teaching mental health, and mentioned a postgraduate course in health education now being held by the University of London—the first of its kind—to train people for giving such teaching. Those attending the course are nurses, teachers, or doctors over the age of 30. There is a great opportunity, he thinks, for teaching mental health principally in the schools: the old are hard to change, but there is hope with the young.

The value of training ordinary social workers in the principles of mental hygiene was mentioned by another speaker: they can change public opinion indirectly, and save us from the mistakes which may come of tackling it directly. On this note of scientific caution the meeting almost expired; but a final speaker urged, without much apparent effect, the essence of Miss Hornsby-Smith's discourse—that the removal of old misconceptions is surely a task worth tackling.

## THE HEALTH OF THE ARMY

IN no section of the community may the principles of preventive medicine be so vigorously or effectively applied as in the fighting Services, and the report on the Health of the Army for 1951 and 1952 [1] confirms that full advantage is being taken of this opportunity. Since all but the most trivial conditions are treated in medical reception stations or hospitals, a reasonably accurate index of morbidity is afforded by figures for admissions to Army medical units; and these, even over the two years covered by this report, show a remarkable decrease.

Not surprisingly, each command has a morbidity peculiar to itself: the admission-rate in Korea and Japan in 1952 was nearly 50% higher than that in FARELF—which, in turn, was some 25% higher than in B.A.O.R. During 1951, when the Korean campaign was getting under way, admission-rates there totalled 1121 per 1000 personnel; the following year, when some of the health problems had been successfully solved, the figure dropped to 788 per 1000.

The major causes of admission in the United Kingdom were tonsillitis and pharyngitis, skin conditions, and the common cold—in that order. In M.E.L.F., on the other hand, skin conditions greatly exceeded any other condition as a cause of admission. In FARELF, and in Korea and Japan, venereal disease was the principle cause of admission. In the latter command venereal disease accounted for no fewer than 387 admissions per 1000 personnel in 1951, and 262 the following year; enemy action accounted for only 85·7 (1951) and 42·7 (1952) admissions per 1000 personnel.

Of deaths reported from or certified in a medical unit in 1952, 7·1% were due to tuberculosis, 23·2% to neoplasms, 11·0% to cardiac conditions, 9·0% to cerebrovascular lesions, and 5·2% to poliomyelitis or polioencephalitis. Tuberculosis deaths totalled 11, compared with 131 in 1948. Accidents accounted for 329 deaths, and enemy action for 35 deaths.

During the two years no major changes were made in the physical standards of entry to the Regular or Territorial Army. Nevertheless, the principle that only a man fit in all respects can make a useful soldier is being replaced by one which recognises that men with appreciable physical limitations can be usefully employed in sedentary duties or under certain strictly defined conditions. As a result of this change of policy, and, more immediately, because of the serious shortage of man-power in the spring of 1951, some men were recruited whose physical category would formerly have debarred them from the Service.

1. Report on the Health of the Army, 1951 and 1952. Not on sale, but copies have been distributed to learned societies.

## FLUORIDATION OF WATER-SUPPLIES

THE Board of Faculty of Dental Surgery of the Royal College of Surgeons of England was asked by the Minister of Health to consider fluoridation of domestic water-supplies in the control of dental caries. The following report, prepared by Prof. H. H. Stones and Prof. M. A. Rushton, has been approved for submission to the Minister.

The board are satisfied that the incidence of dental caries is much less among children and adults who have spent the whole of their prenatal and postnatal life in areas where the drinking-water naturally contains fluoride at a level of one part per million or more, than among those in areas where the water is practically free from fluoride.

In 1945 the fluoridation of domestic water-supplies for reducing the incidence of dental caries was started in certain selected communities in the United States of America, and in one in Canada. Eight of these communities in which fluoridation was started from 1945 to 1948 have been used as study centres. The results obtained each year have been compared with the baseline data; and in some centres, as an additional control, dental examinations have been undertaken in adjoining and comparable communities.

The evidence to date shows a reduction in dental-caries incidence of 40–50% in children of the youngest age-groups, which is comparable to what is observed in areas where the water has naturally a fluoride content of one part per million or more. In the older age-groups the teeth have not been subjected to fluoridation during all their formative period, and the reduction is not as yet so marked. There is nothing to suggest that a water naturally containing fluoride has properties different from those to which fluoride has been added.

In a temperate climate having a population of adequate nutritional standard, fluoride at a concentration of 1–1·5 parts per million as fluorine in the water produces an occasional white fleck on the enamel, but this cannot be detected without expert dental examination and is found in only about 10% of children. The appearance of the teeth is excellent.

There is no scientific evidence of toxicity or of harmful effects in districts with the water-supply fluoridated at this level.

The board considers that there is very strong evidence in support of fluoridation and welcomes the proposal that this procedure should be adopted in the first place in some selected districts that can be used as study centres.

## SCOTTISH STANDING ADVISORY COMMITTEES

THE Secretary of State for Scotland has appointed new members to the standing advisory committees to hold office until Dec. 31, 1957, and has reappointed other members whose terms of office have expired. Medical members have been appointed or reappointed as follows:

*Nursing and Midwifery Advisory Committee.*—Dr. G. J. Summers (Barnton).

*Advisory Committee on Local Authority Services.*—Dr. Richard Scott (Edinburgh.)

*Advisory Committee on Health Services in the Highlands and Islands.*—Dr. Angus Lamont (Foyers); Dr. Thomas Scott (Inverness).

# Parliament

### Committee on Medical Man-power

ON Feb. 21, in answer to a question, Mr. IAIN MACLEOD, the Minister of Health, announced that, with the Secretary of State for Scotland, he was setting up a committee "To estimate, on a long-term basis and with due regard to all relevant considerations, the number of medical practitioners likely to be engaged in all branches of the profession in the future, and the consequential intake of medical students required." The committee would be under the chairmanship of Mr. Henry Willink, Q.C., and the other members would be:

J. T. BALDWIN, M.B., Sir HAROLD BOLDERO, F.R.C.P., Sir JOHN CHARLES, F.R.C.P., Sir HENRY COHEN, F.R.C.P., Sir ANDREW DAVIDSON, F.R.C.P.E., A. B. DAVIES, M.B., J. P. DODDS, Sir GEOFFREY JEFFERSON, F.R.C.S., F.R.S., L. G. K. STARKE, F.I.A., A. B. TAYLOR, D.LITT. The secretary would be P. V. Muston, of the Ministry of Health.

### N.H.S. Supplementary Estimates

On Feb. 16 supplementary estimates for the health service in England and Wales and Scotland [1] were presented in the House of Commons. In introducing the supplementary estimate of £4,848,000 for England and Wales Miss PATRICIA HORNSBY-SMITH, parliamentary secretary to the Ministry of Health, said that the largest item was for hospital maintenance. She paid tribute to the good use the hospital authorities were making of the money made available to them, and pointed out that last year there had been an increase of 8000 in the daily average of occupied hospital beds, of 125,000 in new outpatients, and of 277,000 in casualty attendances.

#### MEDICINE GALORE

The next major item was for the pharmaceutical service. This was mainly due to an increase in the average cost of a prescription which was now 4*s*. 2¾*d*., compared with 4*s*. 1*d*. in 1953–54. An increase of 4½ million prescriptions was expected. The supplementary estimate for the dental services was due to an all-time record for conservative treatment—6 million patients had been treated, compared with 5,400,000 in 1953–54, and those treated under 21 rose from 2,600,000 in 1953–54 to 3 million last year.

Mr. H. A. MARQUAND asked for further details of the cause of the rise in the average cost of prescriptions. Mr. IAIN MACLEOD, Minister of Health, interposed that during the year two expensive drugs, aureomycin and terramycin, had been made freely prescribable. Mr. MARQUAND agreed that expensive drugs were often better value for money than the less expensive ones. But he asked for more information about the Minister's attack on the prices of 91 proprietary articles, which accounted for 18% of the total drug bill. Would it not, he suggested, be a real economy to attract pharmacists back from outside trade and build up a good hospital pharmaceutical service? Salary adjustment alone would do this.

Sir HUGH LINSTEAD was appalled at the vast numbers of bottles of medicine which were, despite all checks, being supplied to the British public. When the increased cost of the pharmaceutical service was translated into terms of 210–220 million prescriptions a year one really had cause to pause. On investigation relatively few drug prices had been found to be excessive. Basically the increased cost was due to the fact that new and more expensive drugs were quickly replacing the old and traditional and cheaper brands. These new drugs were generally proprietary medicines, because a good deal of research was undertaken in the laboratories of manufacturing firms. Some was done in teaching hospitals and universities, but at an early stage the researches had to be turned over to private manufacturing houses for development. A heavy research bill attached to most new drugs before they came on to the market, and it was not unreasonable that these costs should find their way into the final cost of the medicine. The percentage of prescriptions for proprietary drugs had risen, he believed, from 18% of all prescriptions in 1950 to 29% in 1954. Yet in other countries it was much higher, and in France was probably about 80%. These new drugs were saving money by making possible a more rapid turnover of hospital beds. He was sure that substantial economies in the pharmaceutical costs in hospitals could be secured

1. See *Lancet*, Feb. 19, 1955, p. 400.

if the chief pharmacist in each hospital was a person of substantial scientific knowledge who was respected, and whose advice was listened to by the consultant and hospital medical staff. We needed at the top a couple of dozen really first-class appointments that would encourage the intelligent young graduate to stay in hospital pharmacy and not go into industrial pharmacy.

In his reply Mr. MACLEOD said that on the advice of the Public Accounts Committee they had last year embarked on a more realistic method of estimating which did not allow for possible increases in costs and wages. If the general trend of prices was upward we must look forward to a series of supplementary estimates.

Turning to the pharmaceutical services he said that the Ministry had completed their general investigation into the secondary manufacture and compounding of drugs and had stated a preliminary view that there was no evidence to show that excessive profits were being made. They were still considering the accountants' report on basic drugs. There was a general downward tendency in the price of proprietary medicines, and he had no reason to suppose that the investigations were the reason for the reductions. After the investigation was started the Association of British Pharmaceutical Industry had asked him to consider proposals which would alter the basis of the investigations. He had agreed to do so, and that in part accounted for the delay. The industry had made a wonderful advance in recent years; it had an important export trade, and research was vital to it. He thought it right to proceed slowly, though the pace was slower than he would have liked. But he was grateful for the coöperation of the industry and he was sure that it did not seek in any way to defend the indefensible.

### CLINICAL RESEARCH

In the course of the debate Mr. STEPHEN SWINGLER raised an important point of principle. Experiments on human beings were, he agreed, necessary to increase medical knowledge, but doctors should be extremely careful not to use their privileged position to treat human beings merely as laboratory specimens. Medical experiments on patients should not be conducted unless there was a chance of patients benefiting. Clinical experiments in hospital should not be conducted unless the consent of the patients had been freely given in the knowledge of the nature of the experiments. This principle was not being universally observed. In a recent case penicillin had been given to newborn babies, to observe their reaction and to establish the properties of the preparation. There was no question of it having any beneficial effect on the babies. It was established on inquiry that the consent of the parents was not sought; but, even if consent had been given, the experiment appeared to be ethically dubious and he wondered how far the consent of a parent to permit experiments on children was valid. In the opinion of the Minister of Health, and those who conducted the experiment, there was no possibility of harm being done. But in the issue of the *British Medical Journal* in which this experiment was published a doctor at a meeting of the Royal Society of Medicine was reported to have said that a physician should think twice before prescribing the first-ever dose of penicillin to any patient. In the last two or three years at least half a dozen cases had been reported in the medical press of clinical experiments on children in hospitals, designed, not to benefit the children in any way, but to test the reaction of children to certain drugs. That was treating children as guineapigs. The Minister had said that judgment on this sort of question should be left to the clinician in charge of these cases, but some clinicians allowed their enthusiasm for science to override all moral considerations. Mr. Swingler urged the Minister to consult with his advisers and with the British Medical Association and the Medical Research Council, to see whether some kind of directive or code could be sent to hospitals to prevent and to prohibit experiments, especially on children, which were for purely scientific purposes, and were not designed in any way for the promotion of health.

Mr. JOHN RANKIN asked if Mr. Swingler was aware that experiments were carried out on children not in hospitals. One had been going on in an orphans' home. Mr. SWINGLER said he could only deal with hospitals. He did not want to suggest that the practice was widespread or that it had arisen from anything except an enthusiasm for science.

Mr. MACLEOD, in his reply, freely admitted that in the example given the consent of the parents should have been asked for. The people responsible, who were people of the very greatest authority and competence, regretted, as he did, that that was not done. But he did not agree that it was wrong or unethical for any clinical investigation to be carried out which would not immediately benefit the person on whom it was carried out. Without clinical investigation and experiment our knowledge of medicine and surgery would not have changed over the centuries. In his view, only the clinician in charge could say what was right and proper and what safeguards were needed.

It was not the Minister's duty—and he thought it would be wholly improper for him to try—to lay down what ethical and medical principles should govern the conduct of professional men. If a small child of his own were in hospital and he was told by a professor of child health: "We are interested to know the effects of a perfectly safe clinical investigation. It may very well be that we can learn from what is done and as a result can drive still lower the infant-mortality rate in this country," he would be more than ready to give his consent; he would be delighted. Where a clinician intended to undertake an investigation which was so unusual and novel as to amount to an experiment he would be wise to seek consent from the patient or parent, but Mr. Macleod was convinced that it would be wrong for a Minister of Health to issue directives on a matter which was essentially one of medical ethics. Mr. SWINGLER interposed to ask whether the Minister did not think that it was the duty and responsibility of the heads of the medical profession to give some ethical guidance. Would he ask the heads of the medical profession to give some guidance?—Mr. MACLEOD found this suggestion more acceptable, and said that if he had the slightest reason to believe that the present position was not fully understood he would informally draw the attention of those concerned to what had been said. The Medical Research Council had sent out a confidential memorandum rather on those lines. He had no objection to what he might call an informal notification from himself. But he was clear that no directive must come from the Ministry of Health on a matter of this delicacy.

## Care of Spastic Children

Replying to a debate in the House of Commons on Feb. 14 on the welfare of spastic children, Mr. DENNIS VOSPER, parliamentary secretary to the Ministry of Education, said that there were probably about 10,000 children under the age of 16 who suffered from this disease. About 3000 were under the age of five. The responsibility for their treatment was mainly that of the Minister of Health, who was quite aware that treatment should start early. Some 1500 were not capable of receiving education, even in a special school, and about 3000 were very lightly handicapped and were in ordinary schools. Some others were in hospital or getting home tuition, and 1800 were in special schools.

A survey of all physically handicapped children in England and Wales, not only spastics, had lately been completed. The Ministry now had the numbers, names, and details of every child who, in the opinion of their local authority, required admission to a special school. The figure was approximately 450, of whom 400 required admission to a boarding-school. Mr. Vosper admitted that these children were not getting proper education at the moment, but the schools for physically handicapped children already under construction would be more than enough to cope with them. In England 7 schools were being built by voluntary bodies, and 3 by local authorities. Some would be completed this year and, according to the Ministry's plans, all would be completed by 1958.

Almost all the 3000 spastic children in ordinary schools were better off there, because they were receiving the

treatment which they needed through the health service. As to the remainder, there was a difference of view as to whether the children should be in special schools for spastics or in special schools for the physically handicapped, as most were at the moment. There was much to be said for widening the range of these children's experience and placing them among children with handicaps different from their own. The present trend was in favour of day schools rather than boarding-schools. It was important to keep these children with the normal world as much as possible.

The Minister of Health and the Minister of Education were agreed that where there was uncertainty, children should not be classified as ineducable until there had been a trial period in a special school—even sometimes a prolonged trial. In conclusion, Mr. Vosper emphasised the value of voluntary effort. Here, as in most social services, voluntary effort had done great pioneer work.

## Civil Estimates

According to the Vote on Account for 1955–56, which was presented to Parliament on Feb. 21, the Civil Estimates will be £2462 million compared with £2440 million last year. Expenditure on the National Health Service is estimated at £463 million, an increase of £24 million over last year.

## QUESTION TIME

### Diacetylmorphine

Sir HUGH LINSTEAD asked the Home Secretary what action the Government proposed to take concerning the resolution adopted by the Economic and Social Council of the United Nations at its 18th session urging all governments to prohibit the manufacture, import, and export of diacetylmorphine except for such small amounts as may be necessary for scientific purposes only.—Major GWILYM LLOYD-GEORGE replied: The Government have decided to give effect to this resolution. Accordingly the current licences for the general manufacture of diacetylmorphine under the Dangerous Drugs Act, 1951, which expire on Dec. 31, 1955, will not be renewed. After that date licences will only be granted for the manufacture of such small quantities as may be required for purely scientific purposes and for the production of nalorphine, for the manufacture of which diacetylmorphine is required as an intermediate stage. Although the resolution makes no reference to nalorphine the discussions which led up to it recognised that an exception for the manufacture of this drug would be required. I propose to authorise no further exports of the drug save where the export is requested by a government for one of these two purposes. The import of diacetylmorphine will not be permitted.

### Cadmium Poisoning

Replying to a question, Mr. HAROLD WATKINSON, parliamentary secretary to the Ministry of Labour, said that the conclusions in the Medical Research Council report on the lethal effects of cadmium poisoning in a factory at Prescot, Lancashire, were at present being studied on behalf of the department by the Chief Inspector of Factories. At the factories concerned measures, which included improvements to exhaust ventilation and closer medical supervision, had already been taken with the advice of the factory inspectorate to protect the workers against possible harmful concentrations of cadium fumes. The effect of these precautions would continue to be carefully watched.

Replying to further questions, Mr. WATKINSON said that only 14 such cases had been reported from 1938 to 1954, and all the workers affected had recovered. But he was not trying to minimise the importance of this matter. There was no doubt about the toxic nature of the fumes. The difficulty was to get an effective and reasonable cure. Every effort would be made to find such a cure as quickly as possible.

### School Dentists

Replying to a question Mr. D. F. VOSPER, parliamentary secretary to the Ministry of Education, said that the equivalent of 979 full-time dentists were working in the school dental service in England and Wales on Dec. 31, 1954.

### Military Hospitals

Replying to a question Mr. ANTONY HEAD, Secretary of State for War, said that the proposals to spend £15 million over the next three years on building and modernising barracks included the building and modernising of military hospitals. As a start improvements at the Millbank and Cowglen military hospitals were planned.

### Bequests of Bodies

Replying to a question Mr. IAIN MACLEOD said that the number of bodies received as a result of bequests under the Anatomy Act was 39 in 1944–45 and 157 in 1953–54.

### Clinical Investigation

Mr. JOHN RANKIN asked the Secretary of State for Scotland if he was aware that 600 children belonging to the Orphan Homes of Scotland, Bridge of Weir, Renfrewshire, had been used for the purpose of research into a new anti-tuberculosis vaccine; that this experiment had been going on for the last three years; and that now, as a result, a number of the children were suffering from a chronic skin infection.—Commander GALBRAITH replied: In the course of vaccinating these children against tuberculosis it was arranged in the spring of 1951 between the Department of Health and the county council, with the consent and coöperation of the management, to use B.C.G. vaccine for some of the children and the vole vaccine for others. Earlier studies had suggested that vole vaccine was likely to give as good protection with less local reaction, but late skin reactions on the site of the vaccination have been noted in 20 of 280 children who received this vaccine. I am assured that these reactions have been slight and are all clearing up, while the general health of the children has been entirely unaffected.

### Private Nursing-homes

Replying to a question, Mr. MACLEOD said that at Dec. 31, 1953, the latest date for which information was available, the regional hospital boards which had contractual arrangements with profit-making institutions which had remained outside the National Health Service, and the average weekly charge paid for them by each board, were as follows:

| | |
|---|---|
| *General beds:* | |
| South West Metropolitan | £8 19*s.* 8*d.* |
| South Western | £13 13*s.* 0*d.* |
| *Maternity beds:* | |
| Sheffield | £9 14*s.* 5*d.* |
| South East Metropolitan | £7 18*s.* 8*d.* |
| Oxford | £13 15*s.* 4*d.* |
| South Western | £14 14*s.* 0*d.* |

### Hearing-aids

Replying to a question, Mr. MACLEOD said that the numbers of hearing-aids supplied to new patients in the four years 1951–54 were 56,997, 87,925, 85,093, and 67,534. In addition 36,457, 66,519, 96,726, and 116,878 aids were supplied in replacement of aids withdrawn for repair.

### Mobile Radiography Units

Replying to a question, Mr. MACLEOD said that mobile radiography units had examined more than 3 million people last year. The proportion of people examined who were found to have active tuberculosis showed a fairly steady decrease.

## Cost of Drugs

The Minister of Health's reassuring words, in the debate on the supplementary estimates on the cost of drugs, are supported by a Treasury minute which appeared in a report from the Committee of Public Accounts.[1] The subject is of interest both to the Ministry and to the Treasury, for about a third of the output of the pharmaceutical industry goes to the National Health Service. The Ministry's investigation into the cost of unbranded standard drugs and preparations, which has lately been completed, showed that, in a sample of nineteen companies with an annual turnover of about £24 million, the annual average proportion of profit to capital employed was 13·6%. The Treasury agreed with the Ministry that this did not suggest that the level of prices in this field was excessive. Investigations are still continuing into the price-level of selected basic drugs and selected proprietary preparations. Principles on which it would be reasonable to fix prices for proprietary preparations are being discussed with the industry. As an interim measure, where it seems justified, steps are being taken to see whether "immediate reductions in prices can be secured." Some firms have themselves already reduced the prices of particular proprietary preparations. The prices of some of the most widely used basic drugs, which have been falling for some years, have lately been further reduced.

1. H.M. Stationery Office. Pp. 19. 9*d.*

# In England Now

*A Running Commentary by Peripatetic Correspondents*

THE smokeless age will not be without its difficulties. With commendable self-sacrifice the inhabitants of the Palace of Westminster have abolished the last coal-fire from that ancient pile and it seems that the experiment is not proving an unqualified success. No amount of hot air, no heated exchanges can compensate for the glow of self-satisfaction that used to beam on uplifted coat-tails. An honourable and gallant member has complained to the Minister of Works that there is now no reasonable way for an honourable member arriving from the country in a chilled condition to thaw himself out other than by sitting on a radiator or having a hot bath. The Parliamentary Secretary protested in vain that the central-heating plant maintained a temperature of 69° in the members' writing-room, and that an optional grilling to 75° could be obtained at the mere flick of an electric switch. The beam had missed the target.

The teaching of physiology is silent on the peculiar heat-absorption propensities of the human glutei. I used to think it was a male phenomenon until I happened to catch my grandmother unawares with lifted petticoats before the drawing-room grate. Perhaps that is something to do with ladies being so prone to chilblains; vasomotor control gets progressively inefficient towards the periphery. There can be only one stance for the lords of creation on a cold day; the fires of inspiration kindle with spreading glow until the convection currents in the C.S.F. swirl comfortingly around the hypothalamus.

To essay the pose on a steam radiator is to invite the branding of a toast-rack pattern and the leaping alarm of a Texan steer. To stand before an electric fire is to know the pungency of smouldering cloth against a scarlet calf. The English way of life needs more than the forcing heat of American habit. Long woollen underpants hide the gooseflesh beneath the pinstripe suiting. No sitting around in the hall in armless singlets and cotton jeans for us. While whole armies are sinking into the polar ice-cap in their pressurised tubes at 72°, we shall be chopping firewood from our last sledge to stand with all behind us in the southerly breeze.

* * *

A complicated statistical survey at a secondary school in South Staffordshire suggests, from the size of the list, that almost every comic published, whether horrific or not, was read by someone in the school. No doubt a few voracious readers can account for many of the least-read comics. These are probably children whose parents bring "a pile of them home from work," as did the mother of one of the group of backward 10-year-olds whose essays on comics were exhibited. Parental pre-occupation with comics was illustrated by another essayist who said "you can't get a word in egewas when dad's reding comics."

The dangerous void of boredom which will be made by the withdrawal of horror comics will we hope be filled by periodicals from the 43 recommended by the National Union of Teachers as unlikely to have an adverse affect on children and young persons. Quickly scanning the list I was relieved to see that my children's comics were safely on it, so I shall still be able to follow week by week the fortunes of Dan Dare in his spacious battle of wits with the Mekon. As one young essayist explained, it's the suspense of the weekly instalment that gets you.

* * *

A brief introduction to Damon Runyan's American in *Guys and Dolls* before we left for the States convinced us that we would neither understand nor be understood. Medicine being an international common footing we wondered whether we should revise our Latin, but in the excitement of departure Caesar, Virgil, and Ovid could not easily be found. We would perhaps have been wiser to have bought an Anglo-American dictionary, and this might well be included in the instruction list supplied to Fulbright scholars and others visiting the New World. With no such enlightenment we stumbled along the language path, at times surprised by the paucity of dialects in a country so large and a little homesick for the broader accents. Now we no longer call our chocolates anything but candy and successfully contort our minds to reverse the dates on letters. But often we wonder how the garage hand at home will take to our orders for gas or the repair of the hole in our muffler. We were relieved to find malapropisms exist and were delighted to hear of the Cushing patient who had not been weighed in pounds, or even the unheard-of stones, but in kilowatts.

* * *

I was surprised to see on the ward sister's medicine list the array of non-specific stock mixtures—mist. expect. stim., mist rhei co., and so on—that have somehow accumulated against the names of the longer-stay patients. Specific drug therapy is watched carefully, and a course of this usually ends when a given total amount has been taken, or when its ineffectiveness has become apparent. But it seems easier to order a non-specific mixture than to stop it. For one thing, the reasons for prescribing it may be obvious, but the reasons for discontinuing it are less striking. Again the mixture may have been prescribed originally by the H.P., the registrar, or some other member of the staff; and it may have been ordered by telephone, not written in the notes, and then forgotten by the prescriber. In one military hospital the ward medicine list went by bed numbers instead of by patients' names; and by cumulative action a new patient might find himself receiving mixtures prescribed for one or more of his predecessors in the bed.

* * *

The cost of the National Health Service has made many people money-conscious, often people whom you would least expect; and my examiner, an eminent physician by all accounts, was by way of being something of an economist.

"How would you perform Benedict's test?" he asked me, rather as you would throw a dog a bone.

"Well, sir, I'd pour urine into a test-tube to the depth of one inch and add eight drops of Benedict's re . . ."

"You'd do what?" he screamed.

"I mean, sir, that I'd pour Benedict's reagent into a test-tube to one inch deep and add eight drops of urine," I corrected myself.

"Tell me," he said, "would the test work if you used half an inch of Benedict's and four drops of urine?" He sat back in his chair and eyed me beneath his large, bushy eyebrows.

"Well, er, sir, I suppose it would," I replied doubtfully. It seemed logical, but these half quantities never seem to appear in the textbooks.

"It most certainly would, young man!" he cried, leaning forward and fixing me with a stare, "and save the country £50,000 a year!"

* * *

"Thirteen dormies are full up—also we've got measles and mumps which I've luckily had; they keep us in bed for ages here, five days he says at the least anyway two days after your temp. is normal which mine isn't yet. They starve me with Bovril and dry bread which is awfully mean as the others in my dormy have normal temps and have baked beans and jelly."

Such is flu at school. Starve a fever and give a good dose of salts. How long is it since starvation diet for typhoid took its toll of exhaustion and death, and the water-only régime after a hæmatemesis led to hunger and wasting? It takes more than a friendly suggestion from authority to convince a confirmed school matron that food, if it is wanted by the patient, is usually good for her, and that nice things are not of necessity always harmful.

* * *

*More News from School.*—"As you probably deduced from a slight Sunday-letter-deficiency, I have had 'flu. I thought I had escaped it until Wednesday morning, when I secretly took my temperature and registered 99½°. After the senior house match, that afternoon (3–3), for some reason I didn't feel a *lot* better, so I told the correct authorities. 'Overwork; you'll feel better tomorrow.' Tomorrow, as it happened, I felt no better at all, and the next day rather worse than that. On Saturday I registered 102½°; felt so dizzy that I dropped the thermometer (4*s.* 6*d.*) and began to think it was getting beyond a joke. Since then I have been here, suffering. 'Flu does seem to be good for Latin though; for last week's prose I got α. Enough of disease. Thank you exceeding much for the cake."

# Letters to the Editor

## CAPITAL PUNISHMENT

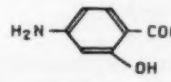
SIR,—In the account in your last issue of the debate in Parliament on capital punishment, I read that the Attorney-General "reiterated the Government's view that with the rising figures for crimes of violence we should not risk at this time abolishing or suspending the death penalty." I am quite unable to understand this argument. It would make sense only if it were generally accepted that capital punishment were the best deterrent; but this is the very point in dispute. It is open to his opponents to say that *because* crimes of violence are rising, capital punishment has failed of its purpose.

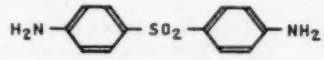
Suppose that in fact these crimes were lessening. Might not Sir Reginald then have argued that there was no point in suspension or abolition, because the present system was working very well? It seems to me that no matter which way the figures for crime are moving, the opponents of change could use them to bolster up their case.

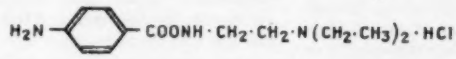
London, N.W.1. E. HINDEN.

## HYPERSENSITIVITY TO PRIMARY AROMATIC AMINES

SIR,—In 1950 we observed [1] that in African patients with leprosy, treated with diaminodiphenylsulphone, a syndrome sometimes developed closely resembling glandular fever, and characterised by fever, lymphadenopathy, generalised dermatitis, mononucleosis, albuminuria, and, in severe cases, jaundice. When first noted by Lowe [2] this syndrome was taken to be glandular fever unmasked by the drug, and, moreover, the Paul-Bunnell test was positive; but later it became apparent that it was a hypersensitivity to the drug, and became less common if smaller doses were given.

P.A.S. 

Diaminodiphenylsulphone 

Procaine amide hydrochloride 

A comparable syndrome due to *p*-aminosalicylic acid (P.A.S.) has been recorded repeatedly.[3–9] The literature contains reports of a great variety of hypersensitivity reactions to many similar drugs, but none followed exactly the pattern of our cases, with the exception of Hellman's [10] case of allergy to procaine amide.

In some recorded cases, hypersensitivity to a combination of drugs exactly resembled the pattern described above (e.g., Marsh's [11] case, in which there was sensitivity to P.A.S., streptomycin, penicillin, chloramphenicol, and local anæsthetic). The patient noted by Jeffrey et al.[12] became sensitive to P.A.S., streptomycin, and penicillin, and they referred to another patient who initially became sensitive to P.A.S. and subsequently reacted violently to streptomycin, penicillin, and 'Sulphatriad.' Since P.A.S. is a common denominator in all these cases, P.A.S. is probably the primary sensitising agent. Hill,[13] discussing Marsh's case, says "When one patient shows hypersensitivity to several drugs it is hard to decide whether one is dealing with a mixture of specific reactions or whether there is a true 'cross-reaction.'" Accordingly, one wonders whether there is anything common to the chemical structure of P.A.S., diaminodiphenylsulphone, and procaine amide, or to their breakdown products, that might account for their causing the same hypersensitivity reaction. Their formulæ indicate that all are primary aromatic amines: these compounds are thought by Hill to be allergenic, while Marsh suggests that the *m*-aminophenol, produced during their breakdown, may be responsible. In either event it is puzzling why the syndrome is not seen with sulphonamides, *p*-aminobenzoic acid, or procaine compounds, since all these contain primary aromatic amines.

Bowie [14] suggests that sensitisation by a previous infection is required for a syndrome of lymphadenopathy, mononucleosis, and heterophil-antibody production, and that the trigger action is provided by subsequent reinfection with the same, or closely allied, organisms. In many cases the agent is probably the organism responsible for epidemic glandular fever, but viruses, bacteria, or even protozoa may possibly produce similar results in sensitised persons. We now suggest that certain drugs containing primary aromatic amines may also produce the syndrome.

JOSEPH BARNES
Dublin. ELIZABETH J. BARNES.

## TREATMENT OF ENURESIS

SIR,—Your leading article of Feb. 19 was most valuable, but you stress the physical factors more than experience with children seems to warrant. As you rightly point out, the presence of an accessory valve is no evidence that it is the cause of dysfunction.

In my clinic for enuretics, where during the past four years over 100 patients have attended, microscopical investigation of the urine was discontinued, because of the persistently negative results. There are, however, some other facts which appear significant, though a full analysis of the case-histories has not yet been possible. The most common single factor is the birth of a sibling before the enuretic-to-be was $2^1/_2$–3 years old. The gap between the siblings is often much less. In some others a major illness or separation occurred between the age $1^1/_2$ and $2^1/_2$. The remaining minority are only children, where a very powerful mother, with either very high standards or considerable resentment, continued to focus the child's attention on his bladder function.

Some two years ago, having realised the significance of drawing in the analytical treatment of children, and because during the history-taking inevitably a relationship was established with the mother, and the child felt left out, I began asking the children to bring their drawings to the clinic. These drawings provide a most interesting clue to their fantasy life. While looking at these drawings, the mother's physical presence could be disregarded, for several reasons. The child and the doctor were together occupied in looking at the pictures, the child offering his explanations and the doctor offering comments, which responded to the fantasy context, and which the child understood, but the mother did not. This has saved much time and it has also established a very personal relationship between the child and the doctor.

Some of these drawings are worth mention.

A girl of 9, who had 3 sisters and was always helpful, obedient, submissive, and undemanding, brought a drawing, representing a female figure. There was a large hat, decorated with flowers, no face or upper part of the body, but a very large abdomen, which she called an "apron." This thinly disguised tummy was decorated with pockets which were

1. Allday, E. J., Barnes, J. *Lancet*, 1951, ii, 205.
2. Lowe, J., Smith, M. *Int. J. Leprosy*, 1949, **17**, 181.
3. Cuthbert, J. *Lancet*, 1950, ii, 209.
4. Kløvstad, O. *Tidsskr. norske Lægeforen.* 1951, **71**, 753.
5. Mann, B. *Tubercle, Lond.* 1953, **34**, 23.
6. McKendrick, G. D. W. *Lancet*, 1951, ii, 668.
7. Rowlands, S. D. *Tubercle, Lond.* 1953, **34**, 143.
8. Sjonkes, P. *Ned. Tijdschr. Geneesk.* 1952, **96**, 2001.
9. Steel, S. J. *Brit. med. J.* 1952, i, 415.
10. Hellman, E. J. *Amer. med. Ass.* 1952, **149**, 1393.
11. Marsh, K. *Lancet*, 1952, ii, 606.
12. Jeffrey, B., Borrie, P., Macdonald, N. *Brit. med. J.* 1952, ii, 647.
13. Hill, A. B. *Lancet*, 1954, i, 296.
14. Bowie, J. C. *Brit. med. J.* 1954, i, 935.

babies' heads. This gave a clue how great her preoccupation was with the number of children who appeared and that this anxiety found outlet in her nail-biting and enuresis. We were able to talk about these "pockets" and both understood what they meant, and she could give a fantasy life to them, which closely corresponded to her real feelings about her sisters.

A boy of 6, who had had a very disturbed early childhood, especially after his first year, had continuous dribbling of urine. Enuresis was less frequent. He was an only child. The mother was a very masculine type and her maternal feelings were very mixed. In some ways she could be a good mother, especially where the boy's physical welfare was concerned, but in other ways she had to reject him. The relationship reached a stage, by the time they came to the clinic, where her rejection was continually justified and reinforced by the soiling of household articles and the boy himself was involved in a "total" defence. By this I mean that he was physically hyperkinetic, unable to relax; emotional restlessness made him talk ceaselessly and he dribbled urine. The mother brought typewritten sheets with her, which described the events of the day, with particular emphasis on what has been ruined. The drawings the boy brought were copious, but every one of them represented a peak. Tents, houses, aeroplanes were all made in the shape of a cone and he had apparently repeated this pattern endlessly. It was impossible to explain to the mother that the boy's whole behaviour was a desperate attempt to reassure himself through his masculinity; but one could talk with the boy about the power, goodness, and effectiveness of these peaks. Reassurance was conveyed through these hypothetical objects and he was able to respond by less dribbling. This easing of the symptoms and the appreciation her boy found in the eyes of someone else, enabled the mother to be less rejecting.

Another boy, aged 8, who had an elder and a younger sister, the younger having been born when he was $1^1/_2$ and just recovered from an illness, brought drawings of a toy-town. While explaining who were represented in the drawing, he suddenly remarked "Gillian is not there." Gillian being the younger sister and very much a thorn in his flesh, and one to whom he could never in reality stand up, this was an excellent opportunity to present a world without Gillian. The masses of smoke coming out of chimneys, a car labouring almost perpendicularly uphill, were all representative of his efforts to combat the world with Gillian, nevertheless. In other words, although he created a world without his sister, in this one he still continued to behave as if she was there. The duality of his emotions was appreciated and his attempts to cope reinforced. His enuresis stopped after four months.

It seems to me that the enuretic child would benefit less from extensive investigations than from understanding what his enuresis stands for in his fantasy. For a submissive child it may represent the only socially acceptable form of revolt, since nowadays all parents know that enuresis is not conscious wickedness; it may also represent one aspect of an over-all aggressiveness, which in turn comes from insecurity. It might be interesting to find out whether the time of the arrival of other siblings plays as great a part in the establishment of enuresis as our case-histories seem to suggest. It would also be interesting to know whether major trauma at this period acts through regression, or through lack of security at a period when toilet training is usually completed.

London, S.W.15. HEDY SYMONDS.

SIR,—"We are not so well equipped to treat enuresis that we can ignore any promising technique." Your interesting leading article makes this valuable point.

In pursuit of this ambition it is worth while quoting Braithwaite's work with enuresis.[1] He described 21 children treated by hypnosis. Only 5 were unaffected and the remainder were improved. He found that direct suggestion, used under hypnosis, was of more value than any other method. I treated 40 cases with similar results.[2] As long ago as 1887 Liébeault[3] published the results of 77 cases treated for enuresis; only 8 showed no improvement. Cullerre[4] reported 24 cases with 21 recoveries; Bramwell[5] described 18 cases, of which 17 recovered, and there were no relapses after some years; Wyllie[6] has reported that "obstinate cases of enuresis have responded to a concentrated form of suggestion, namely hypnosis."

There seems little doubt that hypnosis destroys the anxiety invariably associated with the act of wetting the bed. The majority of cured enuretics will maintain that a wet night followed the thought: "I might wet my bed." Many children, following suggestion, with or without hypnosis, have stated: "I don't seem to worry any more, even if I wet my bed I won't worry." This statement has been confirmed by other workers.[7] It is, of course, the suggestive element in this puzzling condition that makes assessment of drug treatment (or any other treatment for that matter) so difficult. After due consideration of your leading article, it seems worth while to follow-up this line of treatment with controlled research.

London, W.1. GORDON AMBROSE.

1. Braithwaite, J. V. C. *Practitioner*, 1950, **165**, 273.
2. Ambrose, G. *In* Hypnosis in Modern Medicine. Oxford, 1953; p. 196.
3. Liébeault, A. A. *Rev. Hypnot., Paris*, 1887, **1**, 71.
4. Cullerre, A. *Z. Hypnot.* 1894, **4**, 377.
5. Bramwell, J. M. Hypnotism. London, 1930; p. 235.
6. Wyllie, W. G. A Survey of Child Psychiatry. Oxford, 1939; p. 207.
7. Newbold, G. Handbook of Medical Hypnosis. London, to be published shortly.

## GENITO-URINARY TUBERCULOSIS

SIR,—In answer to Dr. Haines's letter of Jan. 22 I should like to quote the following figures from Wrightington Hospital. Wrightington Hospital is a sanatorium which largely treats non-pulmonary surgical tuberculosis, and these figures are for the last three years. During this time the total number of all female cases discharged was 486, and of this number only 26 had gynæcological tuberculosis. None of these 26 had a concomitant renal lesion. Since 1952, 40 female cases of tuberculosis of the renal tract have been treated in the genito-urinary unit, and only 4 of these have had a co-existing gynæcological lesion. It should be pointed out, however, that routine urine examinations are not carried out on non-genito-urinary patients unless they complain of symptoms related to the renal tract. It is therefore possible that one or two cases may have been missed, but even so it would not alter the findings in this unit that in the female it is uncommon to find genital and renal lesions occurring together.

Liverpool. J. G. GOW.

## PSYCHOLOGICAL ASPECTS OF UTERINE DYSFUNCTION

SIR,—Dr. Cramond in his article (Dec. 18) concludes that "fear, emotion, and anxiety play no part in the outcome of labour from the practical obstetrical point of view—i.e., in determining the length of labour or whether forceps will be necessary."

The article, which is concerned with inertia, includes no study of the indications for the employment of forceps, and the second part of the conclusion is thus entirely unproven.

The first part of Dr. Cramond's conclusion—dealing with the length of labour—is based on an analysis of factors such as home environment, the mother's or sisters' obstetric history, psychosexual adjustment, and dreams and anxieties in pregnancy. Other factors which may be relevant, such as whether the pregnancy was planned or not, the length of marriage before conception, relative fertility, and previous abortions are neglected. In addition the puerperium, when emotional tensions are notoriously heightened in many women, may be an unsuitable time for accurate psychological assessment.

Certain factors make those who study women in labour rather than in the puerperium feel sure that their fears and anxieties play a considerable part in influencing the course and duration of their labour:

1. The greater frequency of inertia in strange hospital surroundings, as opposed to domiciliary practice.

2. The frequency with which contractions in early labour cease for a while when a patient is first admitted to hospital with its strange atmosphere and perhaps the company of other—distressed—patients.

3. The greater frequency of postpartum hæmorrhage in hospital practice.

4. The very real effect of what is glibly called sedation and reassurance, but which may make all the difference to the course of a woman's labour and her outlook on future pregnancies.

These facts are mentioned, not in advocacy of more extensive domiciliary practice, but to emphasise the necessity for "psychological" preparation in the antenatal period.

In a study on the human uterus in labour, Garrett [1] has demonstrated one possible way in which incoordinate uterine action may be produced: by maladjustment between the amount of adrenaline and noradrenaline released at sympathetic nerve-endings in the uterus.

Due recognition of the importance of the mother's mental outlook is an important part of antenatal and intranatal care, with its resultant decrease in maternal and fœtal morbidity; and any rash disparagement of this—possibly based on insufficient evidence—would appear to be a step in the wrong direction.

London, N.W.3. H. E. REISS.

## ARTIFICIAL HIBERNATION IN POLIOMYELITIS

SIR,—Dr. Haeger and his colleagues (Feb. 19) and Dr. Brehme (Jan. 15) advocate the use of artificial hibernation in the acute stage of poliomyelitis. I think, however, that such experiments are not justified until the matter has been investigated experimentally in animals. During the acute stage of poliomyelitis the fate of tens of thousands of motor cells hangs in the balance, and this is not a situation in which experiments on patients with new drugs is justifiable. Factors which influence the virus-cell relationship at this critical stage are being much studied by virologists and it is to be hoped that the effects of artificial hibernation, if any, can be elucidated by them.

Department of Neurology,
United Oxford Hospitals. W. RITCHIE RUSSELL.

## PERFORATED PEPTIC ULCERS

SIR,—I was most interested in Mr. Moore's comprehensive review of 125 cases of perforated peptic ulcer in your issue of Jan. 22, and also in Mr. Grieve's letter of Feb. 5.

In Mr. Moore's series of 65 cases treated conservatively, 5 were unproven (table I) and should be discarded, and another patient who died and was treated conservatively, and unaccountably included in the simple-suture series (table II), should be added. If these changes are allowed, the mortality for Mr. Moore's conservatively treated cases is 6·6%, whereas his mortality for simple suture is 2·2%. This suggests simple suture is preferable in spite of its apparent higher morbidity in Mr. Moore's series.

Unlike Mr. Grieve I support Mr. Moore's contention that conservative treatment is nearly always fatal in the severely ill and shocked patient. As Mr. Moore states, these patients must be resuscitated rapidly and operated upon. The ill patient is often elderly and the diagnosis uncertain (note Mr. Moore's case of strangulated jejunum diagnosed as a perforated peptic ulcer), and X-ray examination would be an added burden to these ill patients. I have stressed this point elsewhere.[2]

I must agree, however, with Mr. Grieve's criticism of table v, which appears too diffuse to be of any real statistical value.

Mr. Moore's radiological technique is ingenious and may well be useful, but it does not appear to be uniformly successful in all cases. This stimulating paper gives further food for thought about a very common surgical condition.

Withington Hospital,
Manchester, 20. N. F. KIRKMAN.

1. Garrett, W. J. *J. Obstet. Gynæc., Brit. Emp.* 1954, **61**, 586.
2. Kirkman, N. F. *Postgrad. med. J.* 1955, **31**, 352.

## MENTAL HEALTH AND PUBLIC HEALTH

SIR,—May I, as the editor of the London County Council study group's report,[1] comment briefly on the points raised by Dr. Small and Dr. Ring (Feb. 19)?

To say that it is impracticable to introduce preventive mental-health work into the public-health service at present because the service is "completely unrepresentative of the public as a whole" is, I think, a little too sweeping. Coöperation between family doctor and the public-health service is growing all over the country, a trend which has been happily underwritten by recent B.M.A. policy.[2] Nowadays public-health doctors and health visitors are tackling their work more and more against the background of the family as a unit, rather than by considering the problems of the individual in isolation. It is true, of course, that we have a long way to go yet—shortage of health visitors is one of the factors holding up more rapid progress—but the service is undoubtedly reorientating itself and offers increasing opportunities for preventive mental-health work, with the great advantage of the normal setting in which we are privileged to operate.

Dr. Ring stresses the need for more adequate mental-health training of public-health workers. Most of the L.C.C. study group's report concerns itself with this very problem; the need for better training in mental health as part of the D.P.H., D.C.H., and health-visitor courses is recognised, but beyond this emphasis is laid on intensive in-service training schemes of existing public-health staff.

We considered it essential that such training should be undertaken on an entirely voluntary basis, and advocated that it should take the form of regular case-conference discussions between child-welfare and child-guidance teams operating in the same area. Some pilot groups are already in existence; to draw definite conclusions from their experience would be premature, but the insight into mental-health problems which doctors and health visitors are gaining is being generally welcomed and contributes greatly to the interest and value of their daily work.

Divisional Health Office,
Wandsworth,
London, S.W.18. WILFRID G. HARDING.

SIR,—A London County Council study group (consisting of public-health medical officers, psychiatrists, health visitors, and a psychiatric social worker), reporting on the rôle of local health authorities in mental health, gave particular credit to the work being done by recently trained health visitors and expressed regret that the D.P.H. course did not as yet give sufficient space to mental health. The Society of Medical Officers of Health, in its recent memorandum on the future of child-welfare centres, gave pride of place to work on mental and emotional problems. The Minister of Health and the Secretary of State for Scotland, in circulars issued at the end of 1954, reminded local health authorities that the work of the health visitor "now extends to cover the whole field of prevention of ill-health, including prevention of mental ill-health."

Challenging these weighty authorities, Dr. Cameron (Jan. 29) asserts, without offering any supporting evidence, that a health visitor is by her general nursing training quite unsuited for mental-health work, that her further training does little to equip her to enter this field, and that a better person would be "an unspecialised social worker."

May I ask him two questions? Does he similarly consider that a background of general medical training completely unfits a doctor for all varieties of preventive work, and, if so, will he resign his lectureship in favour of a non-medical social worker? Is he aware of the

1. *Med. Offr*, 1954, **92**, 303.
2. *Brit. med. J.* 1954, i, suppl. p. 125.

very large amount of time devoted in the health visitor's training to the psychology of development and allied subjects ?

As an individual taking part in the teaching both of D.P.H. students and of health-visitor students, I can assure your readers that the London finding is not restricted to the Metropolis. We can equip public-health doctors more adequately for mental-health work by improving their training, not by attacking other people who are already doing excellent work.

Health and Welfare Department,
Corporation of the City
of Aberdeen. I. A. G. MACQUEEN.

## EPIDEMIC VERTIGO

SIR,—After Dr. Leishman's article of Jan. 29, I thought your readers might be interested in an outbreak that I have seen here in the last few months, and in its interesting sequel.

Between Oct. 31 and Jan. 31 I saw 6 mild cases of this disease, all within two miles of each other, and none with any social contact. The ages of the patients were between 45 and 70. 2 of them fell ill on the same day.

In all cases the onset was acute ; the patients woke up with intense vertigo, followed by vomiting. There was no nystagmus or ocular palsy. They all had intense photophobia. They were kept in bed for 7–10 days and given phenobarbitone (gr. 1 b.d.) and mist. bismuth. fort. (t.d.s.). They were able to return to work in three weeks, quite normal.

I have seen in the last twenty years several other similar cases which have followed the same pattern and have had no after-effects.

There is little pathological evidence about these cases, but, thanks to Dr. W. M. R. Henderson, of Pembury Hospital, I can give what I think is some valuable though negative evidence.

One of the 6 patients, a man aged 68, died suddenly while riding his bicycle in Tonbridge. He was taken to Pembury Hospital, where a post-mortem examination established that the cause of death was coronary thrombosis. Serial sections of the inner ears revealed nothing abnormal at all, eight weeks after the attack of vertigo. I realise that this is negative evidence but it may contribute something to our knowledge of this little-known but very disabling disease. I think the mid-brain is the next place to look for abnormal findings.

Hadlow, Kent. JOHN B. MARSHALL.

## LIFE-ASSURANCE UNDERWRITING

SIR,—Your annotation [1] on this subject includes certain remarks which, I feel, cannot be allowed to pass without comment. In the assessment of risks three methods are available :

1. There is the method of adding to the proposer's actual age the number of years estimated to compensate for his reduced expectation of life, and to charge the higher premium applicable. This method is suitable for the increasing type of risk—for example, obesity or hypertension—provided the additional premium is not too heavy.

2. The second method is to impose a diminishing lien whereby a proportion of a capital sum is deducted in the event of early death. The deduction is reduced yearly, so the proposer obtains the full cover on attaining the agreed age. This method is suitable for the decreasing type of risk—for example, recent pleurisy or peptic ulcer—and it is very often invoked when by the first method the additional premium would be too high. The disadvantage of this method is that it does not provide adequate cover for dependents or for collateral security.

3. The third method, which is commonly used in the U.S.A. and is now finding favour in Pakistan, is the numerical method, whereby the risk is assessed under various headings, such as build, personal history, family history, occupation, certain confidential information, and physical condition. This method is of value in assessing both the increasing and the decreasing types of risk, at the same time providing a full cover from the inception of the policy. The numerical method is based on a vast compilation of statistics.

1. *Lancet*, 1954, ii, 1168.

You remark that recent advances in medicine have had little or no impact on life-assurance practice. But by the numerical method every recent advance influences the assessment of a risk.

For instance, a person who has had spontaneous pneumothorax, if thought to be non-tuberculous, can be accepted without loading ; and so, too can one who has had pleurisy if this is judged to be non-tuberculous and the person is of average weight. The greatest change, of course, has been in those diseases which are amenable to antibiotic therapy. In Pakistan patients with malaria can be accepted at the ordinary rate ; and the applicant with a history of a single acute attack of amœbic dysentery treated with antiamœbicidal drugs can also be accepted without loading.

The outlook in life-assurance underwriting is not so bleak as you make it seem. By the numerical system of underwriting, and a wide search for statistics of life risks, underwriting can be made scientific. In this age of specialisation, life-assurance medicine is in danger of becoming a speciality on its own. Yet this work offers opportunities to the general practitioner for research of the sort suggested by the College of General Practitioners. It is the surest means of studying what the late Prof. J. A. Ryle called the "natural history of disease."

R. B. F. KHAMBATTA
Medical Director for Pakistan, American Life
Karachi. Insurance Company.

## CORTICOTROPHIN GEL AS A TEST OF ADRENAL CORTICAL FUNCTION

SIR,—In your issue of Nov. 27 Dr. Nabarro described a procedure for assessing adrenal function. In spite of its apparent completeness this test may occasionally give rise to incorrect results, as is shown in the following case, which is also a further example of recovery from Waterhouse-Friderichsen syndrome treated with cortisone.[1]

On Nov. 22, 1954, a boy of 4 was admitted to this hospital with a twenty hours' history of abdominal pain, headache, and vomiting ; there was marked neck retraction, a purpuric rash over the lower half of the abdomen and scrotum, and an imperceptible pulse, with the blood-pressure systolic 50 mm. Hg, diastolic unobtainable.

*Laboratory Findings.*—White blood-cells 19,000 per c.mm. (83% neutrophils). Cerebrospinal fluid was macroscopically clear with 25 white cells per c.mm. Cerebrospinal fluid and blood-culture : *Neisseria meningitidis* grown.

*Treatment.*—Penicillin 20,000 units was given intrathecally (one dose), and 250,000 units intramuscularly, six-hourly for six days ; and cortisone 25 mg. intramuscularly six-hourly for three days, reducing gradually over the next three days.

The patient's condition improved gradually. Three hours after admission the blood-pressure was 80 mm. systolic, and two days later it gradually rose to 90/60. On discharge, thirty-one days later, it was 90/55. Prior to discharge the serum potassium was 4·6 m.eq. and sodium 129 m.eq. per litre.

In view of the low serum-sodium the child was readmitted one month later for assessment of adrenal cortical function. The test was performed as described by Dr. Nabarro. Corticotrophin (A.C.T.H.) gel 25 units was used as the stimulating dose in view of the child's age. The 17-ketogenic steroid output was estimated in addition by the method of Norymberski et al.[2] adapted for use with ether as solvent. The results were as follows :

| | *Eosinophils (per c.mm.)* | *Na/K ratio* | *17-ketosteroids (mg. per 24 hours)* | *17-ketogenic steroids (mg. per 24 hours)* |
|---|---|---|---|---|
| *Before corticotrophin :* | | | | |
| Day 1 .. | .. | 2·6 | 0·6 | 1·8 |
| Day 2 .. | 64 | 1·4 | 0·4 | 1·3 |
| *After corticotrophin :* | | | | |
| Day 3 .. | 68 | 1·9 | 0·6 | 2·0 |
| Day 4 .. | 87 | 2·0 | 0·5 | 2·9 |
| Day 5 .. | 64 | 2·7 | 0·6 | 3·5 |
| Day 6 .. | 24 | .. | .. | .. |

It will be noted that none of the criteria of normal function as laid down by Nabarro are satisfied, yet the

1. Buzzard, E. M., Higgins, G., Newborne, L. P. A., Pease, J. C. *Lancet*, 1953, ii, 907.
2. Norymberski, J. K., Stubbs, R. D., West, H. F. *Ibid*, 1953, i, 1276.

steadily increasing output of 17-ketogenic steroids indicates normal adrenal activity. It is possible that the eosinophils may have reached less than 10 after a further twenty-four hours, but some limit must be put to the duration of the test. In view of this it is suggested that the estimation of 17-ketogenic steroids should also be carried out before diagnosing adrenal insufficiency. The estimation is simple and satisfactory provided that liberties are not taken with the choice of solvent without proper recovery experiments.

Rush Green Hospital, Romford, Essex. BEULAH R. KNOX
F. BRAFIELD.

## CYCLICAL VOMITING

SIR,—I was glad to see Dr. Millichap's letter of Feb. 19. His experience with a greater number of cases confirms my theory that cyclical vomiting is a form of masked epilepsy.

As so often happens with scientific discoveries the same conclusion has been reached at about the same time by two observers working independently in different parts of the world.

I do not attach much importance to priority, especially when it is merely a question of having had the good fortune to meet the right sort of cases; but to avoid any possible argument later I would like to put on record the fact that my paper was submitted to you on Sept. 12, 1954. As far as I know the first reference to this theory to appear in the medical press was in my letter in the *British Medical Journal* of Nov. 13, 1954, when I wrote: "I am firmly convinced that in the majority of cases (of cyclical vomiting) the constitutional factor is idiopathic epilepsy."

Another point of interest in Dr. Millichap's letter is that some of his cases had had colic in infancy. This is another clue which might be worth following in order to decide whether three months' colic is sometimes epileptic.

Bath. HUGH R. E. WALLIS.

## TETANY AND POTASSIUM DEFICIENCY

SIR,—I was very interested in the paper by Dr. Fourman and Professor McCance in your issue of Feb. 12. Their patient had an acidosis with low serum-potassium and she developed tetany during the treatment with potassium salts when the serum-calcium was normal and the $CO_2$-combining power still low. May I offer an explanation for this rather puzzling phenomenon, which I believe is in agreement with the authors' general idea?

In 1928 [1] I reported investigations on the influence of various ions on the galvanic excitability of peripheral nerves in latent infantile tetany. It was found that the action of cations and anions corresponds closely to the position of these ions in the Hofmeister-series in the region of physiological hydrogen-ion concentration.

This series, which was obtained by the study of colloid-osmotic swelling of gelatin in salt solutions, shows changes, and may be even inverse, with a change of pH, but near to the physiological hydrogen-ion concentration it is as follows: for cations, $Li<Na<K<Rb<Mg<Ca<Sr<Ba$; and for anions, $citrate<tartrate<HPO_4<CH_3COO<Cl<NO_3<Br<CSN$. Cations and anions both show a water-retaining effect on the left side while the repelling of water increases towards the right side.

It is interesting that the patient of Dr. Fourman and Professor McCance developed œdema at the time of tetany. In the experiment the action on electrical excitability was very similar to that on water retention. Calcium and magnesium decrease the excitability, potassium increases it. The action of sodium is demonstrable only when given together with another water-attracting ion, particularly as tartrate. The effect of citrate should be the same, but it is less clearly demonstrable, possibly because of its transformation into isocitrate and its incorporation into the tricarboxylic cycle. In sodium chloride the effect of the cation appears to be over-compensated by that of the anion. Particularly striking is the synergism of calcium and magnesium ions when compared with the specific antagonistic action on the brain [2] and on the pressor effect of adrenaline.[3]

In the case described the treatment did not result in abnormally high potassium levels, but the increased renal potassium clearance suggests an analogous alteration of the blood-tissue barrier and makes it probable that the rapid change from hypopotassæmia resulted in an ionic imbalance within the tissues, and correspondingly to an increase of the excitability of peripheral nerves or neuromuscular junctions. It is in agreement with the mentioned rôle of ions that both potassium and sodium citrate aggravated the tetany.

Pathology Department, Children's Hospital, Birmingham. H. S. BAAR.

1. Baar, H. *Mitt. Ges. inn. Med. Wien.* 1924, **23**, 9; *Z. Kinderheilk.* 1928, **46**, 502.
2. Meltzer, S. J., Auer, J. *Amer. J. Physiol.* 1905, **14**, 366; *Ibid*, 1906, **16**, 233.
3. Baar, H. *Z. ges. exp. Med.* 1926, **50**, 594.
4. Brain, W. R. *Lancet*, 1954, **i**, 687.
5. Cave, A. J. E., Griffiths, J. D., Whiteley, M. M. *Ibid*, Jan. 22, 1955, p. 176.

## MANIPULATION AND CERVICAL SPONDYLITIS

SIR,—Mr. Stamm has hit the nail on the head in his letter of Feb. 12. Pathological conditions involving the cervical spine pass through phases, sometimes acute, subacute, or chronic, and, according to the symptoms they produce, the patients are often seen by different types of doctors, and often require different types of treatment for whatever phase they happen to be in. I would agree with Mr. Stamm on the beneficial effects of a controlled manipulation under thiopentone in the stage of which he speaks.

It has been shown that pain in the neck, apart from disc degeneration and herniation, is often caused by root-cuff fibrosis [4] and osteo-arthritis of the joints of Luschka.[5]

In the early acute or subacute phases we often give gentle manipulative stretching without an anæsthetic, combined with support of varying degrees, physiotherapy, medicinal treatment, and local injections into tender points, according to the type and severity of the case. If the aggravation by treatment is sharp we may stop it and substitute rest, support, warmth, and sedation. We give treatment in the acute and subacute phases and observe its effect and the tissue reaction. If there is an aggravation we call this "purposeful aggravation" since it gives us a lead as to the course the condition is taking. Many cases thus treated quickly become symptom-free.

After a series of progressive gentle manipulations we feel that a condition may develop which would coincide with that described by Stamm, when a controlled manipulation under thiopentone gives more lasting results as terminal adhesions are freed.

We realise that there may be many factors in the production of disc degeneration, such as the stress syndrome, the presence of septic foci, toxic allergic conditions, and possibly diet which may have an effect on the water content of the disc. Is it not true that postural and occupational strains are also a most important factor and often account for the involvement of the muscles?

We believe that there is a condition of chronic postural strain affecting, in the neck and shoulder-girdle region, the posterior cervical muscles including the trapezius, the levator angulæ scapulæ, and the rhomboids, as well as the scapula-fixing serrati. Unless the head and shoulders are held correctly these muscles are strained and become tender.

So many authorities are against the use of the term "fibrositis" because they argue that the condition cannot be proved morphologically. Bruce Casselman, the histologist, in a personal letter states: "Ideally, histochemical studies are correlated with studies of function so that a comprehensive investigation has three 'dimensions': function, chemical composition, and structure. Depending upon the pathogenesis of the condition, it is frequently possible to detect alterations in the first two before there is any change in structure that would be revealed by the conventional histopathological methods."

Is it not possible that these tender points in muscles are due to chemical changes first, and not to cellular ones? If we think carefully, it is clear that they occur chiefly or almost entirely in the anti-gravity muscles.

Other physical signs and symptoms often change with the degree of muscle tenderness. Later, because the muscles are not supporting the joints, these become strained, and some or

all of the muscles of the cervical joints go into protective spasm. Thus the muscles of an area are affected (1) in the early stages by postural strain; (2) later when they go into spasm as a protective phenomenon; and (3) by a true fibrotic state associated eventually with spondylosis. Local injections in any stage will often produce benefit.

It is obvious that we desire to give the patient the best treatment for each phase we find him in, whether it be rest, support, manipulation, physiotherapy, or injections. The patient, however, should be told that disc degeneration and its effects often progress along certain lines. It is possible that treatment may influence its course, but sometimes bad effects occur, such as a transverse myelitis from a protrusion, in spite of all that is done, and in face of the best treatment possible. Therefore, unless there is full understanding of the implications, the patient is liable to blame whatever treatment he is given for the inevitable worsening of his condition.

London, W.1. W. E. TUCKER.

## PULMONARY HYPERTENSION

SIR,—In your editorial of Jan. 15 you point out that cor pulmonale from multiple pulmonary emboli has been described, and quote an American reference.[1] Valuable as is this Transatlantic report, your own columns did contain an earlier account of the same phenomenon.[2]

London, W.1. C. P. PETCH.

## MOLLUSCUM PSEUDOCARCINOMATOSUM

SIR,—There was an interesting correspondence in your columns a year ago on this subject, which revealed some disagreement as to the frequency of the lesion. Beare [3] and Stewart [4] gave estimates which suggested that as many as a third of the conditions ordinarily diagnosed in the past as squamous carcinomata of the skin were in fact mollusca, whereas Halnan [5] had seen only a single case. He, and other radiotherapists with whom we have had the opportunity of discussing the matter, were unwilling to accept the suggestion,[6 7] which follows from the figures just quoted, that some revision of our ideas on treatment of squamous carcinoma of the skin may be necessary. It seemed probable that this discrepancy might be susceptible of a very simple explanation: that the sieving process—dare one say waiting-list treatment?—that precedes entry to most radiotherapy departments might remove most of the mollusca, so that the condition might appear to radiotherapists such as Dr. Halnan very much rarer than it does to those, like Dr. Beare, who see the raw material.

We have belatedly completed a survey of the material of our own radiotherapy department with the object of testing this idea. The numbers involved are too few to justify a formal report but the results are of some interest.

During the years 1942–51 our radiotherapists treated 83 cases under the diagnosis of squamous carcinoma of the skin. We have re-examined the slides of all of these, and have been able to find only 3 mollusca (2·7%). Since 1952, when we began to recognise the lesion, 9 mollusca have been diagnosed, 3 from the radiotherapy department (against 30 squamous carcinomata), and 6 from surgical and dermatological departments (against 20 squamous carcinomata). This last figure, of 6 mollusca to 20 squamous carcinomata, agrees sufficiently well with Beare's estimate, and it is clear that, as we had suspected, mollusca are much rarer than this among cases coming to radiotherapy. Statistics in this, as in so many matters, are not transferable from one type of department to another.

The error in diagnosis of squamous carcinoma treated by radiotherapy has one much more serious factor. There is a group of poorly differentiated skin tumours usually regarded—by most histopathologists probably, and certainly by us until about 1951—as poorly differentiated squamous carcinomata, but which we have learnt [8] to call instead rodent ulcers. The group of 83 reputed squamous carcinomata already mentioned included, besides the 3 mollusca, no less than 21 of these rodents. Among the 59 acceptable squamous carcinomata 9 had recurred: of the 21 re-diagnosed tumours not one had recurred, a difference much more easily reconciled with their being rodents than with their being poorly differentiated carcinomata. It is clear from these figures that there is scope for very great error in the assembly for any purposes of a series of cases of squamous carcinomata of the skin.

We would like to thank the members of our radiotherapy department, and in particular Dr. D. N. Edwards, for their assistance in collecting data on these cases.

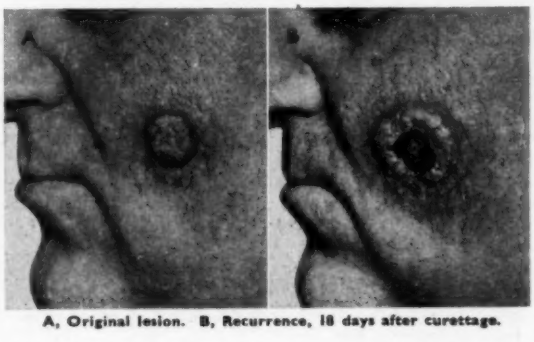
Postgraduate Medical School of London, W.12. E. LIBAN
BERNARD LENNOX.

SIR,—In his paper on recurrent molluscum sebaceum (Jan. 22) Dr. Beare has shown a tenacity to his original diagnosis which has not been shared by others of us in cases where the lesion has recurred or rapidly increased in size after surgical interference. This probably explains the absence of reported accounts of recurrent molluscum sebaceum.

The diagnosis of molluscum sebaceum rests on the duration of the nodule, its appearance, and the often equivocal histological characteristics. In Dr. Beare's second case the lesion was of short duration and had the clinical characteristics of molluscum sebaceum, yet it grew at an enormous rate after surgical interference and was treated by radiotherapy.

The following case, which resembles Dr. Beare's second case, illustrates the possible dangers of this diagnosis:

A man, aged 45, attended this department on May 27, 1954, with a nodule on the left cheek of three weeks' duration which was already almost 2 cm. in diameter. In appearance it was a typical molluscum sebaceum. It was removed by curettage on June 1. On June 18 the original area was



A, Original lesion. B, Recurrence, 18 days after curettage.

surrounded by a thick, firm, rolled edge (see figure). A biopsy specimen was found to show "marked acanthosis, papillomatosis and hyperkeratosis with invasion of the corium by large irregular columns of squamous cells. The tumour is producing 'epithelial pearls' and there is a severe acute or chronic inflammatory reaction to the invading cells. The appearances indicate a grade 1 squamous epithelioma of the cheek."

Treatment at the Sheffield Radiotherapy Centre was begun on the same day with radioactive cobalt-beam therapy (4800r in 21 days of daily treatment). After an initial hyperkeratotic response the lesion healed by Nov. 18, and it remains healed.

1. Owen, W. R., Thomas, W. A., Castleman, B., Bland, E. F. *New Engl. J. Med.* 1953, **249**, 919.
2. Petch, C. P. *Lancet*, 1951, i, 1346.
3. Beare, J. M. *Brit. J. Surg.* 1953, **61**, 167.
4. Stewart, D. T. *Lancet*, 1953, ii, 1096.
5. Halnan, K. E. *Ibid*, p. 1358; *Ibid*, 1954, i, 216.
6. *Ibid*, 1953, ii, 816.
7. Baumann, A., Lennox, B. *Schweiz. Z. Path.* 1954, **17**, 326.
8. Lennox, B., Wells, A. L. *Brit. J. Cancer*, 1952, **5**, 195.

In this department I have seen almost as many of these cases as Dr. Beare has collected, and I am equally convinced that molluscum sebaceum is an entity. I am not sure, however, that in every case it is possible to distinguish it from an epithelioma.

May I suggest that only those lesions which are obviously becoming desiccated and shrinking should be scraped off, and that the fleshy, rapidly growing lesions are still best treated by radiotherapy despite the fact that they may be molluscum sebaceum. Let us retain for the epithelioma the respect which it deserves.

Rupert Hallam Department of Dermatology, Royal Infirmary, Sheffield. RONALD E. CHURCH Senior Registrar.

## JUNIOR HOSPITAL STAFFING

SIR,—The draft report of the Strachan committee on "junior" hospital staffing, together with Dr. Forrester's minority report, will by now have been seen by most medical members of the hospital services. There is one aspect of these reports which does not seem to have received sufficient consideration—namely, that a sub-consultant grade which purports to offer a career in the hospital services must offer to the newly qualified doctor attractions comparable to those offered by general practice. Otherwise the hospitals will be staffed largely by "failed general practitioners."

Conversation with contemporaries who are general practitioners leads me to believe that a prospect of earning a maximum of £2200 p.a., attained some 16 years after qualification, and without the income-tax allowances given to general practitioners, is one which compares unfavourably with the prospects enjoyed by the majority of entrants into general practice. Further, Sir, if the proposed S.M.O. grade is adopted, one wonders how long it will be before an economy-minded Minister of Health starts to use it as an inexpensive substitute for the consultant grade. Adequate safeguards may be sought, but they would probably prove to be as worthless as the recommendations of the Spens Committee.

A. M. READ
Portsmouth Chest Clinic. Assistant Chest Physician.

## PIONEERS IN PSYCHIATRY

SIR,—The opening statement in your annotation of Feb. 19 that "three years after the fall of the Bastille, Philippe Pinel struck the chains from the lunatics in the Paris Bicêtre" conforms with the traditional account which has been copied from textbook to textbook down to the most recently published History of Medicine. But it did not happen quite that way.

Whatever dramatic action Pinel may have taken immediately after his appointment to Bicêtre in 1793 (four, not three, years after the fall of the Bastille), it is clear from his own account that the abolition of chains was the result of several years of patient work in the face of difficulties and opposition. Pinel says [1]:

"The harmful effects of their use had given me much concern during the time I carried out the duties of Physician to Bicêtre, and it was not without extreme regret that I found myself unable to witness the termination of this barbaric custom [because of his transfer from Bicêtre to the Salpêtrière]; but on the other hand I felt quite confident, trusting as I did in the skill of the Superintendent (M. Pussin), whose heart was as set as my own on putting an end to this negation of the true principles of treatment. Success was happily achieved by him two years later, on the 4th of Prairial, year 6 [May, 1798]. Forty unfortunate lunatics, who had languished in irons for various lengths of time, were set at liberty and allowed to move freely about the airing courts, with their movements merely controlled by the use of the strait-waistcoat."

It is perhaps not very clear whether the forty patients referred to were the final batch unchained in 1798 or the total number liberated in five years. Elsewhere [2] Pinel explains that the same result was achieved three years later (i.e., 1801) at the Salpêtrière, again with the assistance of Pussin, who had been transferred at Pinel's special request.

1. Traité de l'alliénation mentale. 2nd ed., p. 201.
2. *Ibid*, preface, p. l.

Cane Hill Hospital, Coulsdon, Surrey. ALEXANDER WALK.

## TUBERCULOSIS IN IMMIGRANTS

SIR,—Dr. James, in his letter of Jan. 29, comments on the figures of tuberculin positivity in County Roscommon.[1] It is admitted that the figure of 14·5% positive at 18 years of age is based on a statistically inadequate sample (69), but taken in conjunction with the other figures in our paper—namely, 14·1% at 16 years (a sample of 249), 12·5% at 14 (494), 10·8% at 12 (852), and so on—it is evident that the whole picture for the county is one of a definitely tuberculin-negative population group.

We are in general agreement with the views expressed by Dr. Hess and Dr. Macdonald (Feb. 12) about the susceptibility of the tuberculin-negative immigrants and the greater risks which they run of becoming infected. Like them we feel that progressive primary tuberculosis is not uncommon.

We cannot accept Dr. James's interpretation of the falling death-rate in Roscommon. The steep fall in recent years is in great part due to the considerable increase in the number of tuberculosis beds, the more enlightened attitude of the people, and improved methods of treatment. Up to a few years ago the facilities for early diagnosis and treatment were totally inadequate. The rate of 100 per 100,000 in 1943 was a war-time peak. The rates for earlier years were much lower. The Registrar-General's return for 1950 [2] compares the tuberculosis death-rates for the years 1925–27 and 1948–50. While the percentage fall for Ireland, in the quarter-century, was 38·7%, that for co. Roscommon, at 10·1%, was the lowest for the whole country. It is probable that this slowing up in the rate of fall in Roscommon was due to the many migrants returning with tuberculosis.

We would like to see a similar change for the better in the morbidity-rate. This has not yet occurred though there is a shift to the older ages. We agree with Dr. James that this shift to the older ages indicates that tuberculosis is receding from the county, but submit that this pattern will be found irrespective of whether a community has been heavily tuberculinised or only slightly, as in the case of County Roscommon.

In citing the lack of evidence of tuberculosis amongst the Irish in Commonwealth countries and the United States, Dr. James is overlooking the fact that recent emigration from Ireland to these areas, compared with that to Britain, is rather small and is widely scattered over great continents. In addition, this emigration is controlled and is largely sponsored in type, the emigrant going to relatives and continuing family life. It is not at all comparable with the figure of 30,000 native Irish who are reported to have gone to Birmingham, to take one example, since the end of the late war. This immigrant group, and the similar London group which were involved in the survey of Hess and Macdonald,[3] are relatively easy to find. No such recent Irish population group exists in the large cities of the New World.

It is not an unusual experience in rural Ireland to find many members of a family infected by a returned emigrant. Similarly, we do not deny that the tuberculin-positive Irish immigrant in Britain may be an epidemiological problem. In fact it appears that the Irish in Britain live very much in "one another's pockets," so that a reactivation of disease in a tuberculin-positive person may often be the source from which a large number of tuberculin-negatives are infected.

For this reason we suggest that, in addition to B.C.G. vaccination, done if possible before emigration, intensive mass radiography of immigrants should be pursued.

Mullingar and Roscommon. MICHAEL P. FLYNN
J. CYRIL JOYCE.

1. Flynn, M. P., Joyce, J. C. *Tubercle*, 1954, **35**, 270.
2. Report of the Registrar-General, 1950. Government Publications Office, Dublin.
3. Hess, E. V., Macdonald, N. *Lancet*, 1954, **ii**, 132.

# Obituary

## CHARLES MARTIN

Kt., C.M.G., M.B., D.Sc. Lond., LL.D., D.C.L., F.R.C.P., F.R.S.

Sir Charles Martin, director of the Lister Institute from 1903 to 1930, was a scientist of an unusual type. He was born in London in 1866 and he studied at King's College and St. Thomas's Hospital. He was an exhibitioner and London University scholar in physiology and the gold medallist of the year in that subject. These early studies in physiology influenced his whole outlook on science and laid the foundation for his very various achievements in medical research. Throughout his career his general scientific grounding fitted him to undertake fruitful work in many different fields and gave his ingenious and original mind the necessary tools for each new task. In addition he had much skill in inventing and constructing apparatus which served as tools for his hand.

Soon after graduating in 1890 he went to Sydney as demonstrator in physiology in the university, and six years later he took the post of demonstrator in physiology in Melbourne, where he presently became professor. As a teacher his methods were arresting and original, and his success in teaching physiology in the young medical schools of Sydney and Melbourne made his name and personality a legend and an inspiration to successive generations of students. The lasting value of his influence was recently recognised when the Australian government founded fellowships bearing his name to enable young Australian medical graduates to obtain postgraduate experience overseas. The gift of exposition and power to impart knowledge remained with him long after he had ceased to carry on any formal teaching.

[J. Russell

During these early years in Australia Martin found time to study the formation of antibodies to snake-venom. He always regarded this as his most important piece of pure research, and it certainly laid the foundation of his scientific reputation. It has particular interest as being concerned with the antibodies to a ferment, as enzyme complexes were still called in those days.

While still in Australia, in 1901, he was elected a fellow of the Royal Society. Two years later he returned to London on his appointment as director of the Lister Institute. This post gave him full scope for his versatile powers. During the next years his work included the study of typhoid and of plague. He was chairman of the War Office Committee on Anti-typhoid Inoculation, and he had a large share in organising the work of the Advisory Committee for the Investigation of Plague in India which was appointed by the India Office, the Royal Society, and the Lister Institute. He spent some time in India in the field in 1905.

As a director of research he had the capacity to guide other workers without inhibiting them. He had a fine insight into what was the essential point of a problem and great ingenuity in framing the appropriate experiments. He also had a keen appreciation of the value of exact methods and applied the quantitative approach whenever it was possible. This is well shown in his work on disinfection, which he carried out in collaboration with Dame Harriette Chick, and also in their work on the coagulation of proteins. With his interest in the working of the animal machine, he recognised the import of Gowland Hopkins's early research on the growth factor, and work on the newly discovered accessory food factors (soon to be called vitamins) was already being carried out at the Lister in 1910. During the 1914–18 war this research grew into the nutritional department which, in a joint investigation with the Medical Research Council, was responsible for the valuable work on rickets done in Vienna by Dame Harriette Chick and her co-workers.

In 1915 Martin had left the institute to join the Australian Army Medical Corps, and he served in Gallipoli, Egypt, Palestine, and France. He did distinguished work in all these areas and became well known for his resourcefulness in mitigating the miseries of disease and for his efforts to investigate and control the spread of infection. In military circles he was also held to be incorrigible in his originality in the use of uniform: the matter was finally left to his own free choice, and he settled for the comfort of the Australian private's uniform, though he held the rank of lieut.-colonel.

On his return to civilian life he was unable to evade some formal recognition of his work. In 1919 he was appointed C.M.G. for his war services. In 1923 he received the Royal medal of the Royal Society, and in 1927 he was knighted. The Universities of Edinburgh, Durham, and Cambridge conferred on him honorary degrees. After his retirement from the Lister Institute, he was invited in 1931 to Australia to become professor of biochemistry and general physiology and head of the division of animal nutrition in Adelaide University. He held this post for three years. The last part of his life was spent in Cambridge, where he kept up his interest in science and was a member of several M.R.C. committees and of the Wool Research Association.

In the late war his gift for hospitality found a wonderful application.

The division of nutrition of the Lister Institute, in which he had always kept a fatherly interest, was obliged to evacuate itself from Chelsea, and gladly accepted his invitation to migrate to his old house with its spacious outbuildings on the edge of Cambridge. In former times the house had been the Roebuck Inn and it was singularly appropriate for the purpose. The changes needed to convert conservatory into animal-house, and coach-house into laboratory (familiarly known as the Medieval Lab), were swiftly made under his supervision and to a large extent with his own hands. The work of the division also permeated the house, even to his own room where the balances were set on a shelf securely fixed to the outside wall. Though some members of the division from time to time found suitable accommodation in different schools of the university, Roebuck House remained the headquarters for more than five years. In this institute-in-miniature, the staff of the division continued to do useful work in an undisturbed environment, and no-one could doubt that its old chief, despite his age and the anxieties of the time, found happiness in the unexpected acquisition of this large family.

Sir Charles Martin died on Feb. 15 at his home at Chesterton. Lady Martin, formerly Edythe Cross, died last year. They were married in 1891, and they leave a daughter.

### TRIBUTES

M. R., to whom we are indebted for much of this memoir, writes:

"As a person Charles Martin was free from affectation of any kind; he would not be bound by convention as to what part of the work he tackled and he had a great feeling of fellowship with the engineers and technical staff. Success left him undisturbed and he was without the faintest trace of pompousness. He had many warm friendships and he held the affection and trust of his staff. He was quick to discover

their aptitudes and talents and was, on the whole, patient with their shortcomings and vagaries, but was intolerant of the spurious and the pretentious. He always had great sympathy with the needs and the outlook of the people with whom he came in contact and was a staunch friend in disaster. The gaiety and humorous outlook of his younger years was saddened by the 1914–18 war and he was only too prescient in thinking that there would not be true peace again in his life-time."

H. C., who collaborated with Sir Charles in many investigations, describes him as a "great director of research."

"He had a wide and deep knowledge of physiology and pathology, had followed closely the development of the new sciences of bacteriology and immunity and had a useful acquaintance with biochemistry and with many aspects of physical and colloidal chemistry. His varied gifts, combined with the fruits of an accurate and retentive memory, were freely shared with his colleagues. A mass of original work, all of high standard and much of great scientific importance, issued from the institute while he was director. Little of it bears his name, though much was owed to his inspiration and help. He was the most generous of chiefs, always anxious to further the reputation of his juniors in preference to his own. To the young investigator needing advice his judgment was invaluable in defining the type of question to which there was a reasonable prospect of obtaining an answer, and in limiting the scope of the inquiry so that too many factors should not be involved. He saved the inexperienced from many fruitless efforts to 'investigate the universe' as he would put it.

"Skilful with his hands, he was never happier than when occupied in his workshop on the creation of some new gadget intended for domestic or scientific use. Many researches in the institute owed rapid progress to the director's skill in devising new methods and producing some necessary and appropriate piece of apparatus.

"His personality, while often disconcertingly direct in manner and abrupt in speech, was endowed with a whimsical charm and evoked warm devotion from all ranks. Like God, he was 'no respecter of persons' and his subordinate staff fared equally with his 'commissioned' colleagues. Under his guidance the Lister Institute was a very pleasant and profitable place in which to work."

L. J. H. came to know Sir Charles as chairman, from 1934 to 1946, of the committee of the Dunn Nutritional Laboratory and to appreciate his "astonishing width of interest and knowledge in the most varied fields of medical research."

"Equally at home in many specialised departments of pathology, physiology, bacteriology, or biochemistry, he had the gift of seeing right into the heart of a problem; and knowing, as he did, how the present knowledge had been won, he equally sensed what gaps still remained to be filled in. He was interested in knowledge for its own sake, and, unlike some lesser men, judged a research finding on its merits alone, not by its authorship. In consequence, he was able to recognise talent and originality where others might miss it, and, as a result, had the satisfaction of fostering young, and sometimes precarious, research careers—leading in one instance at least to a Nobel laureateship. His scientific integrity was marked by a robust sense of right and wrong, and fair dealing, combined with practical common sense. He was prepared, in no uncertain voice, when occasion demanded, to stand up against established authority, when he knew that authority to be in the wrong, and his courageous determination more than once won the day.

"Although in his own tastes simple to a degree, he could prove himself a man of the world in dealing with officialdom. He himself had the gift of handling men, and of dealing effectively with committees and organisations: indeed one of his maxims was that people who failed to rub shoulders with their contemporaries had not succeeded in learning one of the elementary techniques of their trade. Another of his maxims was that it is useless to appeal to reason where a person's emotions have become involved.

"To the end he retained both his charm and penetrating intellectual faculty; and it was an experience to hear him, at the end of the ninth decade of his life, giving his stimulating comments on some future scientific developments which he foreshadowed after reading a paper that had just appeared in a current issue of a scientific journal."

## OSWALD THEODORE AVERY

M.D. Columbia, For. Mem. R.S.

Dr. Oswald T. Avery, the distinguished American bacteriologist, died at Nashville, Tennessee, on Feb. 20 at the age of 77. His brilliant researches into the structure and serology of pneumococci will be remembered as the starting-point of some of the most important advances in modern immunology.

Avery graduated at Columbia University, New York, in 1904, and he soon displayed that skill in applying chemical methods to bacteriology which was to produce such valuable results. In 1913, with his colleague, A. R. Dochez, he began a long study of the antigenic structure of the pneumococcus by serological methods. In 1923 he interested Heidelberger and a number of other chemists in the chemical differences between pneumococci of different antigenic structure; and a new field in serology was opened up. In their first paper his team described a complex polysaccharide obtained from "smooth" pneumococci, and this substance was shown to be responsible for the reactions between pneumococci and antiserum. It was not, however, antigenic, for its injection into animals did not produce antibodies. They later found that the polysaccharide was not specific to the pneumococcus but was identical with similar substances in yeast or gum-arabic which also reacted in the test-tube with antipneumococcal serum. Though the polysaccharide was not antigenic, it could be coupled with other substances—for instance, horse-serum globulin—and then became antigenic and even capable of protecting animals from a fatal dose of pneumococci.

These advances were the result of an organised attack on respiratory diseases, of which Avery was the leader, and the striking progress achieved was largely due to his stimulus. He showed the way to later developments which are now making it possible to interpret immune reactions in terms of exact chemistry.

For many years Avery was a member of the Rockefeller Institute in New York. In 1944 he was elected a foreign member of the Royal Society, and he was awarded the society's Copley medal in 1945.

## CLAUDE RUNDLE

O.B.E., M.D. Lond., D.P.H.

As superintendent of the isolation hospitals at Fazakerley, Dr. Rundle was associated with the Liverpool city hospital service for close on thirty years.

He was born in 1873 at Plymouth, and educated at the Grammar School of that city. In 1895 he qualified from St. Mary's Hospital and he graduated M.B. Lond. three years later. Almost at once he joined the public-health service, and his first appointments were with the Metropolitan Asylums Board as medical officer at Gore Farm Convalescent Hospital, Dartford, and as senior assistant medical officer at the Grove Fever Hospital, Tooting. In 1901 he took the D.P.H. About this time he became medical superintendent at the Orchard Smallpox Hospital, Dartford, and in the great smallpox epidemic of 1901 he served on the hospital ships stationed in the Thames estuary for the emergency.

These early experiences naturally led him to choose infectious diseases as his life's work. In 1904 he took his M.D., and two years later he was appointed the first medical superintendent of the isolation hospitals at Fazakerley. He organised the main isolation hospital of 350 beds which was opened in the year he arrived. Later the annexe hospital, which had been built some years before, was added to make a complete unit which was to become known throughout the country.

Dr. Rundle held a commission in the Territorial Army from 1908, and in the first world war, with the rank of lieut.-colonel, he commanded the Berrington War Hospital. He was also responsible for about 100 auxiliary units scattered over Western England and Central Wales. For a time he commanded No. 55 General

Hospital in France, and for his services he was appointed O.B.E. in 1919. J. M., who first met him at Berrington Hospital, writes:

"On his medical staff he had two Irishmen, north and south respectively, an elderly fundamentalist, a thoroughly businesslike medical officer, and me. He kept us all in good humour, including the commandants, with amazing skill. He was a very dignified figure with a long face and a moustache; a slight droop on one side of his mouth, perhaps due to an old facial paralysis, gave him a somewhat supercilious manner in appearance and speech. This he used to full advantage to confound the evil-doers—that is, slackers and pretenders. In hours of work he was firm and efficient, never wasting a word, but in the evenings when we sat at mess he used to delight those who were not his victims by playing us against one another, especially the realist against the fundamentalist. His method was to make some outrageous statement that stirred up some member of the mess; and he then conducted the quarrel like an orchestra, reaching a conclusion that brought inextinguishable laughter all round. The commandants one and all adored him: I am sure this was not because he was at that time a bachelor but on account of his infinite charm, patience, and courtesy. He used to bring us home tit-bits in his pocket from his more wealthy clients and invent droll fairy stories about them.

"Rundle knew every patient personally and he could sometimes be quite disconcerting by showing greater clinical insight about a sick man than the medical officer who was in charge; but he never interfered—he only asked."

Soon after his return to civilian practice a large sanatorium of 265 beds was opened in 1920 on the Fazakerley estate, and as superintendent of the whole group of hospitals he had charge of some 900 beds. For many years he was also lecturer in infectious diseases at Liverpool University. He revised the third edition of *Ker's Manual of Fevers* (1927) and the third edition of *Ker's Infectious Diseases* (1929). His published work included papers on bed-isolation methods, a technique in which he was a pioneer. He was a deputy lieutenant of the county of Lancaster.

He retired in 1934 to West Looe, a place for which he always had a great love. He died at his home there on Dec. 24. He is survived by his widow and married daughter, both of whom are doctors.

## PHILIP TURNER

### M.S., B.Sc. Lond., F.R.C.S.

OUTSIDE Guy's Hospital, Philip Turner was not so well known as some of his contemporaries; but within the hospital, by his sincerity and loyalty, he won a special place in the affection of his colleagues and students.

He was born in 1873, the son of Arthur James Turner, of Kensington. He was educated at King's College and University College, graduating B.SC. with honours in zoology. He continued his medical studies at Guy's Hospital, where he held an entrance scholarship. He won many of the prizes open to students, and finally gained the treasurer's gold medal in clinical surgery. While holding house-appointments at Guy's and a clinical assistantship at Great Ormond Street, he prepared himself for the higher surgical qualifications, and in 1901 he took the M.S. and F.R.C.S. In 1902 he was appointed registrar at Guy's and the following year demonstrator in anatomy. In 1904 he joined the staff of the Belgrave Hospital for Children, but he gave up this appointment when he was elected to the staff at Guy's in 1908. There for two years he was in charge of the ear department. Later he became lecturer in operative surgery. As an assistant surgeon for seventeen years he had only a small number of beds and was somewhat overshadowed by the dominant personality of his senior, Sir Alfred Fripp. He held the appointment of full surgeon for eight years, and he attained the honourable position of senior surgeon only a fortnight before he retired. He contributed articles to many well-known surgical textbooks, and his other publications included *Operations of Surgery*, *Pocket Osteology*, and *Inguinal Hernia*.

[Elliott & Fry

During the late war he returned to work in the Guy's sector as a senior surgeon in the Emergency Medical Service at Joyce Green Hospital. After the war he retained his interest in the hospital, and, as his reception as chairman of the Guy's biennial dinner a few months ago showed, his place in the memory of Guy's men.

N. L. E. writes:

"Philip Turner had a dry and retiring personality, and he was seldom seen at extramural activities. But within the hospital there could be no more devoted servant. Every patient under his care became his personal concern, and no detail too small to be noticed. He was neat and meticulous in all his work, and those who were on his firm are indeed grateful for his lessons in technique. He had a prodigious memory, and nothing gave him more pleasure than to recount, with exactness of detail, incidents and case-histories from his long experience. In the 1954 Christmas number of the *Guy's Hospital Gazette* he recounted his experiences as a locum some fifty years ago, as if they had just happened.

"Turner was never known to say ill of anyone. He was an extremely lovable man, and like a father to all who worked under him."

Few people will remember Philip Turner as a young man (writes W. H. O.)

"When I came to Guy's as a student he must have been in his thirties, but he seemed to be weighed down already with the seriousness of life and the importance of surgery, with the gravity of the decisions he had to make and the example he must set to the young. I do not believe he ever possessed a motor car. He always came by tube or bus, and he was never late. He dressed in morning coat. He spoke with the utmost earnestness, and even when he allowed himself to make a joke, he announced it seriously, explained it carefully, and after marking its climax by a restrained and formal chuckle, he hastened to return to his previous mood of solemnity.

"There is no place comparable to a medical school for the correct assessment of values, no psycho-analysis more penetrating than that of the unformulated judgment of several generations of students. Philip Turner's capacity for work, his unfailing sense of duty, his knowledge of anatomy and of surgical history, his gift of clear exposition earned him respect, and his obvious sincerity and his loyalty to his hospital and his students earned him affection. And in that affection he blossomed. His approach became less formal, his jokes more spontaneous and more frequent, and in his last ten years he developed social gifts and a capacity for enjoyment that made him one of the most popular men of his time."

His wife, formerly Miss Helen Lambert, predeceased him in 1932. He died on Feb. 16 at the age of 81.

## Colonel A. E. HAMERTON

R. E. R. writes: "Hamerton was a very remarkable person. He was one of the last generation who still regarded India and Africa not just as places to work in but as areas for inspiration and adventure. He might well have stepped out of the pages of Rider Haggard. His life was packed with adventure and I remember him saying: 'I don't care what they take from me, they cannot take my memories.' His quality is, I think, best revealed in his confession that even when working for the Sleeping Sickness Commission he could never bring himself to shoot a giraffe: it was far too beautiful."

In our obituary of Colonel Hamerton (Feb. 12) the inadvertent omission of the words "an outbreak of" suggested that he was the first to describe acariasis in monkeys. Mites were identified in monkey's lung as early as 1901 and a description of the infestation was published by Helwig in 1925.

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A memorial service for Sir Edward Mellanby will be held at St. Martin-in-the-Fields at 11.30 A.M. on Thursday, March 17.

# Notes and News

## ACTIVITIES OF F.A.O.

In the early days of the United Nations optimists with imagination hoped that the Food and Agricultural Organisation, under the directorship of Boyd Orr, might find grand solutions for the urgent problem of providing sufficient food for the ever-increasing population of the world. The latest F.A.O. report [1] shows that such hopes have become pipe-dreams. Perhaps there are no grand solutions. Yet F.A.O. is neither idle nor disillusioned. Instead it has settled down and assumed the function of a large-scale scholastic agency dealing in technical education; and education is a slow process, which cannot immediately give startling results.

In 1954 F.A.O. was responsible for the selection, organisation, and partial payment of over 200 experts, who visited various foreign countries to help with technical advice. Since 1951 nearly 800 experts have taken part in such missions. Similarly in 1954 about 140 fellowships were awarded to enable persons to receive special technological training which was not available in their own country. The experts advised in such diverse fields as improvement of hide and skin processing in Libya, irrigation in East Pakistan, fisheries development in Chile, and ground-water development in Syria. Fellowships were awarded to an Israeli for the study of milk hygiene in Denmark and Sweden, to a Nepali to study dairying and animal husbandry in New Zealand, to a Yugoslav to study home economics in Holland and France, to an Egyptian to study rice production in Japan, and to two Thais to study agricultural economics in the U.S.A. These are only a few of the large body of carefully selected fellows and experts who are continually travelling about the world receiving and distributing technical knowledge. They must be making a solid contribution to material prosperity in many underdeveloped countries. Perhaps equally important they are part of an international system for the exchange of ideas and good will, and so they contribute to international understanding. It is unfortunate that the budget for this work fell from $6,049,000 in 1953 to $5,536,000 in 1954. The work depends on the assistance of countries' contributions to the Technical Assistance Fund—and first and foremost that of the United States. If this work is to be carried on, it must have the good will and support of responsible citizens in every part of the world.

## BLOOD-COAGULATION AND THROMBOSIS

The latest issue of the *British Medical Bulletin* [2] gives a valuable and candid survey of present British views on the fundamental problems of blood-clotting, blood-vessel thrombosis, and the use of anticoagulants. British workers have made notable contributions to this subject during the past seven years or so, and anyone who wishes to set out on further work from an up-to-date base cannot do better than read the articles in this issue.

## LONDON SCHOOL OF HYGIENE AND TROPICAL MEDICINE

The report of the work of the school in 1953–54 [3] emphasises again the international scope of its activities. A large number of overseas visits were paid by senior members of the staff, for the purposes either of consulting with foreign colleagues interested in a particular aspect of research, or of attending international conferences. Dr. Andrew Topping, the dean, and Prof. G. Macdonald, director of the Ross Institute of Tropical Hygiene, visited the site of the proposed dam across the Volta River in the Gold Coast; their report on the health problems involved included a detailed specification of the preventive, curative, and industrial medical services for two major labour forces and for the new town to be built in the vicinity of the dam. The school's various training-courses have once more had a full quota of students. The number of candidates for the D.T.M. & H. courses has remained much the same as last year, but there have been more entrants for the D.P.H. course with tropical medicine as the elective subject. Greater emphasis has this year been laid on industrial medicine in the course on public health, and the scope of the elective course in industrial health has been widened. The report includes a summary of the research done during the year in the various departments.

1. Activities of F.A.O. under the Expanded Technical Assistance Program, 1953–54. F.A.O., Rome. December, 1954.
2. *Brit. med. Bull.* 1955, **11**, no. 1. London: The British Council. Pp. 81. 15*s*.
3. Report on the Work of the School for the Year 1953–54. London School of Hygiene and Tropical Medicine (University of London), Incorporating the Ross Institute, Keppel Street, Gower Street, London, W.C.1.

## CONVALESCENT HOMES FOR LONDON

King Edward's Hospital Fund [1] have published the 1955 edition of their *Directory of Convalescent Homes* serving Greater London. The first part includes homes within the four Metropolitan hospital regions; the second part lists homes outside the regions which are prepared to admit patients from London. Useful classified indexes will enable the busy doctor to choose in a moment, for instance, a home for a middle-aged gentlewoman with asthma who wishes to go to Broadstairs and have breakfast in bed.

## EXHIBITION OF HEARING-AIDS

The modern electrical hearing-aid consists of a microphone, an amplifier, and a receiver; small dry batteries supply the current. Much ingenuity has gone into reducing the size and weight of the components, and into prolonging the life of the batteries. The 'Medresco' aid,[2] which is issued on free loan under the National Health Service, has undergone several such modifications in the last few years; and some of the different patterns now available were displayed at a small exhibition held last week in London by the Ministry of Health.

The earlier models, though still widely used, are gradually being replaced by lighter and more efficient instruments. Last year, for example, the supplies division of the Ministry issued no fewer than 200,000 new hearing-aids, 4,000,000 batteries, and 60,000 ear-moulds, and over 1,000,000 other components. Latest figures show that nearly 400,000 persons have been provided with medresco aids. Nevertheless waiting-lists remain large, chiefly because of the difficulty in issuing the instruments quickly enough from the 60-odd centres throughout the country.

The newest model on view—the medresco monopack—has been specially designed for children. Little larger than a packet of ten cigarettes, it weighs only a few ounces, and runs off a battery less than $1^1/_2$ in. long. Field trials will begin shortly, and if they are successful the instrument will go into mass production. Also on show were a number of different patterns of ear-trumpet. Not surprisingly, these retain a degree of popularity among older patients, and more than 1000 were issued by the Ministry last year.

1. Copies may be had from the offices of the Fund, 10, Old Jewry E.C.2. 7*s*. 6*d*. (post free).
2. Gray, P. G., Cartwright, A. *Lancet*, 1951, i, 1170.

### University of Sheffield

At the jubilee congregation to be held in the city hall on Wednesday, June 29, 1955, the honorary graduates will include Lord Adrian, O.M., F.R.S., who will receive the honorary degree of D.SC.

Dr. O. G. Dodge has been appointed lecturer in pathology. The title of reader has been conferred on Dr. Gilbert Forbes, at present senior lecturer in charge of the Department of Forensic Medicine.

### Royal College of Surgeons in Ireland

Over two hundred fellows and guests attended the annual charter day dinner of the college on Feb. 12. The toast of The Guests, who included the Surgical Travellers' Club, was proposed by Mr. A. B. Clery, the vice-president, and Prof. Eric Ashby, vice-chancellor of the Queen's University, Belfast; and Sir Stanford Cade replied. The toast of The College was proposed by Sir Heneage Ogilvie; and Mr. Ian Fraser, the president, replied.

On Feb. 18 the fellowship was conferred on the following:
J. S. R. M. Lavelle, F. X. O'Connell.

### Society for General Microbiology

The general meeting of this society will be held at the Roya Institution, Albemarle Street, London, W.1, on April 18–20. On Monday, the 18th, at 6 P.M., Prof. C. B. Van Niel of the Hopkins Marine Biological Station, California, is to give the Marjory Stephenson lecture, on Natural Selection in the Microbial World. Visitors will be welcome to this lecture. On Tuesday and Wednesday, the 19th and 20th, there will be a symposium on mechanisms of microbial pathogenicity. Further particulars may be had from the society, c/o the Institute of Biology, Tavistock House South, London, W.C.1.

### Research Board for the Correlation of Medical Science and Physical Education

The board announce that the William Hyde Award of £300 has been given this year to Dr. Roger Bannister for his studies of physiological reactions to stress.

### World Health Organisation

World Health Day, which will be celebrated in most countries on April 7, will have for its theme Clean Water Means Better Health.

### West End Hospital for Neurology and Neurosurgery

A course of clinical demonstrations in neurology is to be held at this hospital, 91, Dean Street, London, W.1, on Tuesdays at 5.30 P.M. from March 1 to May 10. Admission is free and the demonstrations are open to doctors and students.

### Committee on Trial Case Lenses

The Minister of Health has appointed a committee to review "standards for trial case lenses and the method of measuring lens powers and to make recommendations." The medical members are Sir Stewart Duke-Elder (chairman), Mr. J. E. Ayoub, and Mr. F. W. Law.

### Basingstoke Plastic Centre Medical Society

On Thursday, March 10, at 7.30 P.M., at Rooksdown House (Park Prewett Hospital), Basingstoke, Mr. N. L. Rowe will take the chair at a symposium on Fractures of the Middle Third of the Facial Skeleton. The speakers will include Mr. R. S. Lawrie, Mr. M. A. Falconer, Dr. R. P. W. Shackleton, Mr. H. C. Killey, Mr. Gordon Midgley, and Mr. B. W. Rycroft.

### French Exchange Scholarships

Under the terms of a reciprocal arrangement with the Centre National de la Recherche Scientifique, the Medical Research Council invite applications from British workers in medical science, excluding clinical medicine, for two scholarships tenable at research institutions in France during 1955–56.

The scheme is intended for young graduates in medicine or science who have already had some experience in a branch of medical science. Candidates must be of British nationality and have at least a working knowledge of French. The scholarships will normally carry a maintenance allowance of 50,000–70,000 francs a month, and married men will receive a supplementary allowance. Forms of application may be had from the Secretary of the council, 38, Old Queen Street, London, S.W.1, with whom applications must be lodged by March 31.

## Appointments

DREW, C. E., M.V.O., M.B. Lond., F.R.C.S.: part-time consultant thoracic surgeon, St. George's Hospital, London.
SCOTT, A. E. R., M.R.C.S.: asst. M.O., and deputy M.O.H., Slough.

**Leeds Regional Hospital Board:**

CUMMING, A. R. R., M.D. Aberd., M.R.C.P.E.: whole-time consultant geriatrician, Hull and East Riding.
SUFFERN, W. S., M.D. Leeds, M.R.C.P.: part-time consultant in general medicine and geriatrics, Bingley, Keighley, Skipton, and Settle area.
TODD, JOHN, M.B., D.P.M.: whole-time consultant psychiatrist, Menston Hospital, near Leeds.
WATERS, G. W., M.B. Manc., D.P.M.: whole-time asst. psychiatrist and deputy medical superintendent (S.H.M.O.), Meanwood Park Hospital, Leeds.
WHITE, J. M., M.D. Glasg., D.P.M.: consultant psychiatrist, and deputy physician superintendent, Stanley Royd Hospital, Wakefield.

**Sheffield Regional Hospital Board:**

BREST, SIMON, M.B. Wales, D.P.M.: whole-time senior asst. psychiatrist, Carlton Hayes Hospital, Narborough, near Leicester.
FORREST, B. G., M.B. St. And., D.A.: consultant anæsthetist, Rotherham and Mexborough H.M.C.
HOLDWAY, VERA, M.R.C.S., D.P.M.: whole-time senior asst. psychiatrist, Carlton Hayes Hospital.

**North East Metropolitan Regional Hospital Board:**

CLARK, A. S., M.B. Lond., D.P.M.: part-time consultant psychiatrist, Edmonton child-guidance clinic.
JENKINS, W. J., M.D. Wales: whole-time consultant pathologist and medical director, Brentwood Blood Transfusion Centre.
JOHNSON, J. H. P., M.B. Calcutta, M.R.C.P.: whole-time consultant chest physician, Tottenham chest clinic.
WHITEHEAD, J. P. S., M.R.C.S.: whole-time consultant pathologist, Tilbury and South East Essex group.

**Appointed Factory Doctors:**

ARNEY, K. B., M.B. Brist.: Kingwood, Gloucester.
CARNACHAN, G. A., M.B. Glasg., D.OBST.: Kirkmichael, Banff.
JOHNS, B. A. E., M.B. Birm., M.R.C.P.: Sheffield West, Yorks.
JOYCE, THOMAS, M.B. Edin., M.R.C.P.E.: Troon, Ayr.
LYNCH, A. D., M.B. Glasg.: Kilwinning, Ayr.
PAUL, J. G. S., M.B. Edin.: Ineravon, Banff.
RITCH, D. R. S., M.B. St. And.: Alloa, Clackmannan.
TILSLEY, D. A., M.R.C.S.: Sheffield, 6, Yorks.

## Diary of the Week

FEB. 27 TO MARCH 5

### Monday, 28th

MEDICAL SOCIETY OF LONDON, 11, Chandos Street, W.1
8.30 P.M. Mr. Denis Browne, Mr. Nils Eckhoff: Common Congenital Deformities.
MANCHESTER MEDICAL SOCIETY
9 P.M. (Medical School.) *General Practice.* Dr. F. R. Ferguson: Migraine and Epilepsy.

### Tuesday, 1st

BRITISH POSTGRADUATE MEDICAL FEDERATION
5.30 P.M. (London School of Hygiene and Tropical Medicine, Keppel Street, W.C.1.) Dr. C. H. Andrewes, F.R.S.: New Look in Virus Research.
ROYAL SOCIETY OF MEDICINE, 1, Wimpole Street, W.1
5 P.M. *Pathology & Epidemiology and Preventive Medicine.* Prof. Theodore Crawford, Dr. J. E. French, Prof. H. W. Fullerton, Dr. J. N. Morris: Coronary Artery Disease.
8.30 P.M. *Orthopædics.* Mr. R. Weeden Butler: Vertebral Osteochondritis. (Presidential address.)
ST. MARY'S HOSPITAL MEDICAL SCHOOL, Paddington, W.2
5 P.M. Mr. John Beattie: Abnormalities of Bladder Function.
INSTITUTE OF DERMATOLOGY, St. John's Hospital, Lisle Street, W.C.2
5.30 P.M. Dr. C. Hodges: Superficial X-ray Therapy.

### Wednesday, 2nd

ROYAL SOCIETY OF MEDICINE
5.15 P.M. *History of Medicine.* Dr. Ffrangcon Roberts: Effects of Epidemics on Population and Social Life.
8 P.M. *Surgery.* Mr. C. Naunton Morgan, Prof. J. C. Goligher, Mr. Ralph Marnham: Minor Ailments of the Anal Canal.
INSTITUTE OF DERMATOLOGY
5.30 P.M. Dr. R. W. Riddell: *Trichophyton rubrum* Infection.
INSTITUTE OF LARYNGOLOGY AND OTOLOGY, 330, Gray's Inn Road, W.C.1
6 P.M. Dr. H. Engström (Stockholm): Anatomy of the Cochlea by the Electron Microscope.
MIDLAND MEDICAL SOCIETY, Birmingham Medical Institute, 154, Great Charles Street, Birmingham, 3
8.15 P.M. Dr. J. F. Brailsford: Lesions of the Intervertebral Discs.
LIVERPOOL MEDICAL INSTITUTION
4.30 P.M. (Joint meeting with the Manchester Medical Society at the University of Manchester.) Prof. A. W. Downie: Virus of Chickenpox and Herpes Zoster. Dr. C. A. Clarke: Methods of Investigating Inherited Factors in Disease.
MEDICO-CHIRURGICAL SOCIETY OF EDINBURGH
8.30 P.M. (Royal College of Surgeons, 18, Nicolson Street.) Dr. A. G. MacGregor, Dr. C. F. Rolland: Hypopituitarism.

### Thursday, 3rd

ROYAL COLLEGE OF SURGEONS OF ENGLAND, Lincoln's Inn Fields, W.C.2
5.30 P.M. Mr. A. J. Gardham: Evolution of Major Surgery in the Mouth and Pharynx from the time of Trotter to the Present Day.
ROYAL SOCIETY OF MEDICINE
8.30 P.M. *Otology.* Mr. Terence Cawthorne: Otosclerosis. (Dalby lecture.)
ROYAL ARMY MEDICAL COLLEGE, Millbank, S.W.1
5 P.M. Dr. J. F. Loutit: Acute Radiation Syndrome.
UNIVERSITY OF ST. ANDREWS, Medical School, Small's Wynd, Dundee
5 P.M. Dr. F. G. Spear: Use and Misuse of Radiation.

### Friday, 4th

POSTGRADUATE MEDICAL SCHOOL OF LONDON, Ducane Road, W.12
2 P.M. Mr. R. W. Raven: Malignant Melanoma.
ROYAL SOCIETY OF MEDICINE
10.30 A.M. *Otology.* Dr. Sölve Welin (Malmö), Mr. W. I. Daggett. Mr. I. Simpson Hall: Radiology of the Temporal Bone.
2.30 P.M. *Laryngology.* Mr. H. P. Lawson, Mr. Neville Young: Bilateral Abductor Palsy. Mrs. Florence Cavanagh: Vocal Palsies in Infancy.
5.30 P.M. *Anæsthetics.* Dr. H. C. Churchill-Davidson: Abnormal Responses to Muscle Relaxants.
INSTITUTE OF DERMATOLOGY
5.30 P.M. Dr. P. D. Samman: Lichen Planus.
METROPOLITAN EAR, NOSE, AND THROAT HOSPITAL, at St. Mary Abbots Hospital, Marloes Road, W.8
5.30 P.M. Mr. Terence Cawthorne: Surgery of the Ear. (James Yearsley lecture.)
ROYAL FACULTY OF PHYSICIANS AND SURGEONS OF GLASGOW, 242, St. Vincent Street
5 P.M. Mr. Matthew White: Thoracic Surgery in Children.

### Saturday, 5th

INSTITUTE OF LARYNGOLOGY AND OTOLOGY
NOON. Dr. Engström: Anatomy of the Vestibule by the Electron Microscope.

CORRIGENDUM: *Argentaffinoma as Endocrine Tumour.*—In the letter by Dr. I. H. Page and others (Jan. 22, p. 198) the name of Dr. Albert Sjoerdsma was incorrectly spelt. The last three signatories wrote from the National Heart Institute, Bethesda 14, Maryland.

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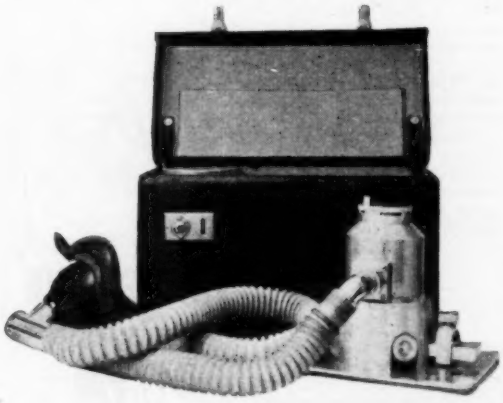

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*The Terms and Conditions of Service of Hospital Medical and Dental Staff apply to all N.H.S. hospital posts we advertise, unless otherwise stated. Canvassing disqualifies, but candidates may normally visit the hospital by appointment.*

## Academic and Educational

### UNIVERSITY OF LONDON

A COURSE OF 2 LECTURES on "Mechano-Chemistry of Muscle" will be given by Academician W. A. ENGELHARDT (Moscow) at 5.30 P.M. on 8TH and 16TH MARCH at Westminster Medical School (Meyerstein Lecture Theatre), Horseferry-road, S.W.1. Admission free, without ticket.

JAMES HENDERSON, Academic Registrar.

### UNIVERSITY OF GLASGOW
POSTGRADUATE MEDICAL EDUCATION COMMITTEE

REFRESHER COURSE FOR GENERAL PRACTITIONERS

A Refresher Course of 1 fortnight's duration designed for General Practitioners will be held from 16TH MAY to 28TH MAY, 1955. The greater part of the Course will comprise clinical demonstrations, ward visits, and lectures in general medicine, general surgery, and obstetrics, but sessions on infectious diseases, child health, ophthalmology, dermatology, and rehabilitation of the aged will also be included.

The fee for practitioners not claiming expenses from Government sources is 10 guineas.

Since the number admitted to the Course is limited, early application should be made to the Director of Postgraduate Medical Education, The University, Glasgow, W.2, from whom the syllabus and further information may be obtained.

### THE WELSH NATIONAL SCHOOL OF MEDICINE
(UNIVERSITY OF WALES)

WILLIAM SHEEN MEMORIAL LECTURE

The Fifth William Sheen Memorial Lecture will be given by Sir GEOFFREY JEFFERSON, C.B.E., F.R.S., M.S.(LOND.), LL.D. (GLAS.), F.R.C.S., F.R.C.P., Emeritus Professor of Neuro-Surgery, University of Manchester, on WEDNESDAY, 16TH MARCH, 1955, at 8 P.M. in the Reardon Smith Lecture Theatre, Park-place, Cardiff.

The lecture is entitled:

THE ANEURYSMS OF THE CAVERNOUS SINUS.

All medical practitioners and present and past students of the Medical School are cordially invited.

### COURSE IN ADVANCED ORTHOPÆDICS
at the
INSTITUTE OF ORTHOPÆDICS
28TH MARCH–1ST APRIL, 1955

Monday, 28th March, Town Section, 234, Great Portland-street, W.1 (Lecture Room)
10.40 A.M.–12.40 P.M. Scoliosis .. .. .. Mr. J. I. P. JAMES
2.00 P.M.–3.00 P.M. Bacteriological Aspects of Joint Tuberculosis .. Dr. C. H. LACK
3.00 P.M.–4.00 P.M. Volkmann's Contracture .. Mr. H. J. SEDDON
Tuesday, 29th March, Town Section
10.15 A.M.–11.15 A.M. Metabolic Disorders of Bone .. Dr. R. NASSIM
11.30 A.M.–12.40 P.M. Pain Down the Arm .. Dr. P. F. SANDIFER
2.00 P.M.–4.00 P.M. Medical Aspects of Joint Tuberculosis .. Dr. F. H. STEVENSON
Wednesday, 30th March, Town Section
9.45 A.M.–10.45 A.M. Bone Repair .. .. .. Dr. H. A. SISSONS
11.00 A.M.–12.40 P.M. Peripheral Vascular Disorders .. Mr. G. L. W. BONNEY
2.00 P.M.–3.00 P.M. Biochemistry in Orthopædics .. Dr. P. G. WALKER
3.00 P.M.–4.00 P.M. Slipped Femoral Epiphyses .. Mr. H. J. BURROWS
Thursday, 31st March, Country Section, Brockley Hill, Stanmore, Middlesex (Hut 5)
10.30 A.M.–12.40 P.M. General Clinical Demonstration .. Mr. D. TREVOR
1.45 P.M.–2.45 P.M. Spondylolisthesis .. .. Mr. P. H. NEWMAN
2.45 P.M.–4.30 P.M. The Early Treatment of Paralysis in Poliomyelitis .. Mr. D. M. BROOKS
Friday, 1st April, Country Section
10.30 A.M.–12.40 P.M. General Clinical Demonstration .. Mr. K. I. NISSEN
2.00 P.M.–3.00 P.M. Plaster of Paris Technique .. Mr. E. L. TRICKEY

The fee for the course (including lunch and tea) is 7 guineas. Early application should be made to the Dean at the Town Section.

### TUBERCULOSIS EDUCATIONAL INSTITUTE
SULLY HOSPITAL, PENARTH, GLAMORGAN

A 3-day CLINICAL COURSE for Doctors will be held at Sully Hospital on 23RD, 24TH and 25TH MARCH.

Fee 3 guineas (excluding accommodation).

Particulars from Secretary, Tuberculosis Educational Institute, Tavistock House North, Tavistock-square, London, W.C.1.

**ST. GEORGE'S HOSPITAL AND MEDICAL SCHOOL.** (UNIVERSITY OF LONDON.) Applications are invited for the post of SENIOR LECTURER IN HÆMATOLOGY in the Medical School. Applicants should be registered medical practitioners with extensive clinical and laboratory experience in hæmatology. The successful candidate will be an Honorary Consultant in the Hospital. He will take charge of the Hæmatological Department (including blood-transfusion) under the administration of the Director of Pathology, from whom further particulars of the appointment can be obtained.

Applications, giving the names of 2 referees, should reach the Secretary, St. George's Hospital Medical School, Hyde Park-corner, London, S.W.1, before 2nd April, 1955.

### TANCRED'S STUDENTSHIPS

DIVINITY : MEDICINE : LAW
£100 p.a. each. For Men only

About Whitsuntide next the Governors propose to elect 1 Student in Law at Lincoln's Inn. Candidates must have been born in England, Scotland or Wales and be members of the Church of England and unmarried.

Candidates must be within the ages of 20 and 23 years on 1st October, 1955. The last day for sending in Petitions is 8th March, 1955.

Further announcements relating to the Physic and Divinity Studentships awarded by this Foundation will appear in April and September, 1955.

Apply for further particulars and form of Petition stating kind of Studentship and mentioning this paper to the Clerk, R. M. C. HOWARD, Esq., D.S.O., 28, Lincoln's Inn-fields, London, W.C.2.

### SOCIETY OF APOTHECARIES OF LONDON

DIPLOMA IN INDUSTRIAL HEALTH

The next Examination will begin on MONDAY, 4th JULY, 1955. The following Examination will be held in December, 1955.

For Regulations apply Registrar, Apothecaries' Hall, Black Friars-lane, London, E.C.4.

**UNIVERSITY COLLEGE LONDON (Gower-street, W.C.1)** requires Full-time RESEARCH ASSISTANT (Man or Woman) in Department of Anatomy (Prof. J. Z. Young) for work mainly on the central nervous system. Duties to commence 1st May, 1955, or as soon as possible thereafter. Preference to candidates with Honours Degree in medical sciences or biology; knowledge of German desirable. Salary £600 p.a., with family allowances.

Applications, to be received by 26th March, 1955, should be sent to the Secretary, from whom further particulars may be obtained.

**LONDON SCHOOL OF HYGIENE AND TROPICAL MEDICINE.** Applications are invited for the post of LECTURER in the Ross Institute of Tropical Hygiene (Department of Tropical Hygiene) in the London School of Hygiene and Tropical Medicine. The appointment will be made at an appropriate point in the scale for Junior Lecturers, £900–£1100, or Senior Lecturers, £1250–£1750, depending upon the experience and qualifications of the individual appointed. Both of these salary scales are now under revision.

Applications, with full details and names of referees, should be sent to the Dean, London School of Hygiene and Tropical Medicine, Kennel-street (Gower-street), London, W.C.1.

**INSTITUTE OF UROLOGY in association with** St. Peter's, St. Paul's and St. Philip's Hospitals. Full-time BIOCHEMIST (science degree or medical qualifications essential) required for work in connection with urological disease. Experience of routine biochemical tests and an interest in research necessary. The post is of Senior grade and Whitley Council scales will apply.

Apply: Secretary, Institute of Urology, 10, Henrietta-street, W.C.2, stating age, qualifications and experience and enclosing copies of 2 recent testimonials. Closing date 12th March, 1955.

**MEDICAL RESEARCH COUNCIL. Applications are** invited for the post of RESEARCH ASSISTANT in the Climatic and Working Efficiency Unit of the Medical Research Council at the Department of Human Anatomy in the University of Oxford to take part in fundamental studies of muscle and joint action and the application of this to clinical, industrial and service problems. Candidates should have a medical degree or an honours degree in physiology or zoology. The salary will be dependent on qualifications and experience. Superannuation provision will be made under the Federated Superannuation System for Universities.

Applications, giving age, qualifications, experience, list of published work and copies of testimonials, should reach Prof. Sir WILFRID LE GROS CLARK, F.R.S., Department of Human Anatomy, University Museum, Oxford, not later than 30th April, 1955.

**THE UNIVERSITY OF LIVERPOOL. Applications are** invited for the post of LECTURER in the Department of Tropical Medicine within the School of Tropical Medicine, at an initial salary according to qualifications and experience, within the range current at the time of appointment.

Applications, stating age, academic qualifications and experience, together with the names of 3 referees, should be received not later than 31st May, 1955, by the undersigned, from whom further particulars may be obtained.

STANLEY DUMBELL, Registrar.

**THE UNIVERSITY OF MANCHESTER. Applications** are invited for a RESEARCH FELLOWSHIP in the Department of Education of the Deaf tenable for 2 years from 1st June, 1955, with a possibility of renewal after that period. Candidates should possess a medical qualification. Experience, either as a Senior or Assistant Medical Officer of Health, or in the field of pædiatrics or otology is desirable. The gross value of the Fellowship will be within the range of £1500–£1900 p.a.; the stipend being determined according to qualifications and experience.

Applications should be sent not later than 15th March, 1955, to the Registrar, the University, Manchester 13, from whom further particulars and forms of application may be obtained.

**U.S.A. NEBRASKA. Applications are invited for a** PSYCHIATRIC RESIDENCE-FELLOWSHIP appointment to the Nebraska Psychiatric Institute of the University of Nebraska and affiliated hospitals. This is a fully approved training programme fulfilling the 5-year requirements of the American Boards of Neurology and Psychiatry. Salary $4800–$7200 p.a. Personal interview may be arranged with faculty member now in London.

Application should be made to: Address, No. 109, THE LANCET Office, 7, Adam-street, Adelphi, London, W.C.2.

**CAIRO UNIVERSITY. Faculty of Medicine.** Applications are invited for the following vacant whole-time posts :—

(*a*) **School of Dentistry**

(1) PROFESSOR OF PROSTHESIS : applicant should have special experience in prosthetic appliances.

(2) PROFESSOR OF ORAL SURGERY : applicant should have medical and dental qualifications and should have special experience in maxillo-facial injuries.

(*b*) **Faculty of Medicine, Cairo**

(1) 2 ASSISTANT PROFESSORS IN ANATOMY.

(2) 2 ASSISTANT PROFESSORS IN PHYSIOLOGY with special experience in electrophysiology or endocrinology.

*Salaries :*

Professors from £E900 to £E1500 p.a.

Assistant Professors £E720 to £E1080 p.a.

Both grades plus £E300 expatriation allowance and £E90 high cost-of-living allowance.

It is stipulated that the English language is the one used in teaching. Travelling expenses for candidate and family to Egypt and back at the end of the contract will be paid by this University on presentation of bills. 2 months leave are granted annually. Period of the contract is 2 years, renewable by mutual agreement.

Applications, with qualifications, publications, particulars of previous posts, teaching experience, and age, should reach the Dean, Faculty of Medicine, Cairo University, not later than 30th April, 1955.

## Hospital Services : Senior Appointments

**GUY'S HOSPITAL, S.E.1. The Board of Governors** invites applications for the appointment of an ASSISTANT PHYSICIAN in the Department of Psychological Medicine, for attendance on 5 sessions per week. The appointment is of Consultant status and applicants are required to hold higher qualifications.

Applications (1 copy), together with the names of 3 referees, should be submitted to reach the Superintendent, Guy's Hospital, S.E.1, not later than 25th March, 1955. In accordance with Statutory Instrument No. 1259 of the National Health Service Regulations, canvassing members of the Board or Advisory Appointments Committee will lead to disqualification.

**LAMBETH HOSPITAL, Brook-drive, S.E.11. Locum** ASSISTANT RADIOLOGIST (Senior Hospital Medical Officer grade) required for an indefinite period, from 3rd April.

Applications, giving professional details and names of 2 referees, to the Group Secretary.

**MIDDLESEX HOSPITAL, W.1. Applications invited for** the post of ASSISTANT THORACIC SURGEON (Consultant), for 3 half-days weekly. Candidates must be Masters of Surgery or Fellows of the Royal College of Surgeons of England.

Applications, naming 3 referees, should be sent to the Deputy Superintendent by 26th March.

**ST. BARTHOLOMEW'S HOSPITAL, London, E.C.1.** Applications are invited for the post of CHEMICAL PATHOLOGIST to the Hospital and LECTURER IN CHEMICAL PATHOLOGY to the Medical College, tenable as from 1st July, 1955. The successful candidate will be on a full-time salary basis part of which will be paid by the Hospital and part by the Medical College. The appointment will be subject to a satisfactory health report.

Applications, together with the names of 3 referees, should be received not later than 1st April, 1955, and should be addressed to C. C. CARUS-WILSON, Clerk to the Governors.

**EAST ANGLIAN REGIONAL HOSPITAL BOARD.**

(1) CONSULTANT RADIOLOGIST (whole-time or maximum part-time), King's Lynn-Wisbech Area. Main hospitals : West Norfolk and King's Lynn General Hospital—144 Beds ; County Hospital, Doddington—116 Beds ; and North Cambs. Hospital and Clarkson Hospital, Wisbech—271 Beds. Wide experience in specialty and higher qualifications essential. Candidates invited to visit hospitals by direct arrangement with Hospital Management Committee Secretary, West Norfolk and King's Lynn General Hospital, King's Lynn.

(2) CONSULTANT PHYSICIAN-SUPERINTENDENT (whole-time), Papworth Hospital. In addition to clinical duties appropriate to a Consultant Chest Physician, the successful candidate will be responsible for day-to-day medical administration as Medical Superintendent of the Hospital. Candidates must possess wide experience of tuberculosis and diseases of the chest and hospital administration. Higher qualification essential. Candidates invited to visit Hospital by direct arrangement with Hospital Management Committee Secretary at the Hospital.

Applications (8 copies), stating age, experience, and names of 3 referees, to Secretary of Board, 117, Chesterton-road, Cambridge, by 7th March, 1955.

**LEEDS REGIONAL HOSPITAL BOARD.**

(1) Whole-time appointment of SENIOR CASUALTY OFFICER for duties at the Batley and Dewsbury General Hospitals. The person appointed to undertake duties in the Casualty Departments under the general supervision of the Consultant Orthopædic Surgeon-in-Charge, together with duties in the Orthopædic Department at the Batley General Hospital, and be resident in or near Batley. The salary will be within the range of £1500–£1950 p.a. and the tenure of the appointment will be for a period not exceeding 4 years. The appointment will be superannuable and subject to terms and conditions of service as laid down by the Board which will be similar but not necessarily identical to the terms and conditions of service of hospital medical and dental staffs.

(2) Whole-time Locum SENIOR HOSPITAL MEDICAL OFFICER in Anæsthetics for duties at hospitals in Pontefract and Goole. Appointment will be for period of up to 1 year and person appointed will be required to reside in Pontefract.

Applications (12 copies), stating age, qualifications and details of appointments held showing dates, with names and addresses of 3 referees, to the Secretary, Park-parade, Harrogate, not later than 18th March, 1955.

**SHEFFIELD REGIONAL HOSPITAL BOARD.** Whole-time CONSULTANT PSYCHIATRIST for Mapperley Hospital, Nottingham, and associated clinics. A modern house will be available.

Application forms and further details from Senior Administrative Medical Officer, Sheffield Regional Hospital Board, Old Fulwood-road, Sheffield. Forms to be returned by 19th March, 1955.

**SOUTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD** requires Whole-time ASSISTANT RADIOLOGIST (Senior Hospital Medical Officer grade) for the Croydon Group (Croydon General Hospital, 200 Beds ; Mayday, 618 Beds ; Purley, 53 Beds ; and Norwood, 38 Beds). General diagnostic work at above hospitals under direction of the 2 Consultant Radiologists ; D.M.R. essential.

Applications (5 copies), giving date of birth, qualifications, experience, and names of 3 referees, to Secretary (S.1), South West Metropolitan Regional Hospital Board, 11A, Portland-place, W.1, by 19th March, 1955. Applicants may visit hospitals by local arrangement.

**PERTH. WESTERN AUSTRALIA. PRINCESS MARGARET HOSPITAL FOR CHILDREN.** The Board of Management invites applications for the post of SENIOR HOSPITAL MEDICAL OFFICER. Salary £1745 (Australian) p.a. (subject to cost-of-living variation) provided candidates have sufficient qualifications and experience. Accommodation available for single persons at a cost of £139 p.a. Generous travelling allowances where the appointee is prepared to serve a minimum term.

Applications in writing and addressed, by air-mail, to the undersigned should detail personal particulars, qualifications, experience, &c., and include the names of 2 referees.

J. D. CLARKSON, Manager.

**SOUTH AFRICA. PROVINCIAL ADMINISTRATION OF THE CAPE OF GOOD HOPE. UNIVERSITY OF CAPE TOWN.** Joint Medical Staff for Groote Schuur and other Teaching Hospitals. Vacancies :—

Applications are invited from registered medical practitioners (Registered Specialists) for appointment to the following vacant posts at the Groote Schuur Hospital, Observatory, Cape Town :—

**Department of Radiodiagnosis**

MEDICAL PRACTITIONER (grade G) with salary at the rate of £2000 p.a.

MEDICAL PRACTITIONER (grade F) with salary at the rate of £1800 p.a.

MEDICAL PRACTITIONER (grade E) with salary at the rate of £1600 p.a.

MEDICAL PRACTITIONER (grade D) with salary on the scale £1200–£50–£1500 p.a.

In addition to the salary indicated, a cost-of-living allowance at rates prescribed from time to time by the Administrator is payable. The leave and pension privileges attached to the posts and other conditions of service are governed by the relevant ordinances and regulations.

Candidates for the above posts must have the following qualifications :—

Medical Practitioner (grades G, F, and E) : Not less than 3 years experience after registration as a Specialist in the specialty in which the vacancies exist.

Medical Practitioner (grade D) : Registration in the specialty in which the vacancy exists.

Successful candidates will be appointed to the joint Medical Staff and will be required to serve jointly the Provincial Administration of the Cape of Good Hope and the University of Cape Town.

The successful applicants will be required to submit satisfactory birth and health certificates and their appointment will be subject to the following conditions :—

1. Appointment will be on contract for 5 years in the case of a citizen of a Commonwealth country or the Republic of Ireland and 6 years in the case of a citizen of European countries other than the United Kingdom and the Republic of Ireland.
2. Transport expenses (third class by rail overseas and second or cabin class steamship fare and first class by rail in the Union) necessarily incurred by the successful applicants from place of residence to the place of assumption of duty in South Africa, will be defrayed by the Administration provided that, if the contract is broken within 1 year of the date of assumption of duty, the persons appointed must refund to the Administration the full amount paid in respect of transport expenses and if the contract is broken within 5 years of the date of assumption of duty in the case of a Commonwealth citizen and 6 years in the case of a citizen of another European country, the persons appointed shall refund to the Administration the pro rata share of the full amount above referred to in respect of the unexpired period.
3. The persons so appointed will be offered permanent appointment during the terms of contract but not earlier than 3 years from the date of assumption of duty or with effect from the conclusion of the contract, provided they have passed an examination in Afrikaans as second language, which examination shall not be lower than the standard required for the Junior Certificate Examination of the Department of Education of this Province and provided further that their services and conduct during the period of contract are satisfactory and their state of health is such as will enable them to continue to discharge efficiently all the duties of the post in which they will be employed.

Application must be made on the prescribed form, Staff 23, which is obtainable from the Staff Clerk, Room 102, South Africa House, Trafalgar-square, London, W.C.2. The completed application forms must be addressed to the Director of Hospital Services, P.O. Box 2060, Cape Town, South Africa, and must reach him not later than 31st March, 1955. Candidates must state the earliest date on which they can assume duty.

**MANCHESTER REGIONAL HOSPITAL BOARD.**

(*a*) Whole-time Additional CONSULTANT RADIOLOGIST to Wigan and Leigh Hospital Centre, about 5 sessions in the Leigh area (Leigh Infirmary, &c.) and the remainder at the Royal Albert Edward Infirmary, Wigan, and other hospitals in the Group. Wide experience and higher qualifications essential, appointee to live in Leigh area. 15th March, 1955.

(*b*) Whole-time TUBERCULOSIS PHYSICIAN AND MEDICAL OFFICER in charge of a Mobile Mass Radiography Unit (Senior Hospital Medical Officer) based on Ladywell Hospital, Salford. Appointee will also have clinical duties under general guidance of a Consultant at Chest Clinics, &c., in the Salford or adjacent areas. Previous experience of chest diseases and M.M.R. required. 14th March, 1955.

(*c*) Whole-time NON-RESIDENT ASSISTANT RADIOLOGIST (Senior Hospital Medical Officer) to the Stockport and Buxton Hospitals (Stockport Infirmary, Stepping Hill Hospital, Stockport, Devonshire Royal Hospital, Buxton, and Buxton Hospitals, &c.). Wide experience and D.M.R.D essential; appointee to live in Stockport area. 10th March, 1955.

Application forms from the Senior Administrative Medical Officer to the Board, Cheetwood-road, Manchester, 8, to be returned by dates stated.

**NORTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD.**

(1) CONSULTANT PHYSICIAN in charge of Physical Medicine (part-time, 2 half-days a week), Hounslow Hospital, Middlesex (81 Beds).

Applications by 28th March, 1955.

(2) CHILD PSYCHIATRIST (whole-time or 9 half-days a week), Berkshire Child Guidance Service. Service administered by Joint Committee of Berkshire County and Reading Education Authorities and Oxford and North West Metropolitan Regional Hospital Boards. Duties include clinic at Maidenhead, sessions in Reading Clinic and psychiatric care of children in hostels for maladjusted children in Maidenhead and Wokingham. Possibility of session for adult psychiatric outpatients at Royal Berkshire Hospital. Salary £1500 (unless below 32 years)–£1950.

Applications by 4th April, 1955.

Clinics and Hounslow Hospital may be visited by direct appointment.

Application forms obtainable from, and returnable to, Secretary, North West Metropolitan Regional Hospital Board, 11A, Portland-place, W.1.

**OXFORD REGIONAL HOSPITAL BOARD.** Applications are invited for the whole-time post of ASSISTANT GERIATRICIAN (Senior Hospital Medical Officer grade) to the hospitals of Northampton and Kettering Hospital Management Committees as a member of the Area team. There are approximately 1000 beds devoted to geriatrics in the area. Candidates must have had considerable experience in this field, a higher qualification is desirable. Candidates are invited to visit the hospitals by arrangement with the Consultant Geriatrician, St. Edmund's Hospital, Northampton. The successful candidate will be required to reside in the Kettering area.

Full details of the post may be obtained from the Secretary, Oxford Regional Hospital Board, 43, Banbury-road, Oxford, to whom applications (10 copies), stating age, qualifications and experience, together with the names of 3 referees, should be submitted by 12th March, 1955.

**OXFORD REGIONAL HOSPITAL BOARD.** Applications are invited for the post of ASSISTANT ANÆSTHETIST in the grade of Senior Hospital Medical Officer for 9 sessions per week (non-resident) to the hospitals of High Wycombe and District Hospital Management Committee as a member of the Area Department. Applicants should hold the D.A. The hospitals may be visited by arrangement with the Secretary, High Wycombe and District Hospital Management Committee.

Applications (10 copies), stating age, qualifications, experience, and the names and addresses of 3 referees, to reach the Secretary of the Board, 43, Banbury-road, Oxford, by 18th March, 1955.

## Hospital Services : Junior Appointments

**BATTERSEA GENERAL HOSPITAL, Battersea Park,** S.W.11. CASUALTY OFFICER (residence optional). House Officer or Senior House Officer grade according to experience. Vacant end of March.

Apply Hospital Secretary, enclosing copies of 2 testimonials.

**BATTERSEA GENERAL HOSPITAL, Battersea Park,** S.W.11. RESIDENT SURGICAL OFFICER (Junior Hospital Medical Officer grade), vacant end of March.

Apply Hospital Secretary, enclosing copies of 2 recent testimonials.

**BROMPTON HOSPITAL, S.W.3. Applications invited** for the following posts :—

RESIDENT SURGICAL OFFICER (post graded as Senior House Officer or Registrar, according to qualifications and experience), for which there are 2 vacancies, for 6 months from 1st May with eligibility for reappointment. Candidates must have held a resident hospital appointment.

RESIDENT HOUSE PHYSICIAN for which there are 3 vacancies, for 6 months from 1st May. Duties include work in Outpatient Department and wards. Salary £475 or £525 a year, according to experience.

Applications, stating age, qualifications with dates, nationality, and appointments held, together with copies of testimonials, by 5th March, to KENNETH A. F. MILES, House Governor.

**CENTRAL MIDDLESEX HOSPITAL, Park Royal,** N.W.10. NORTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD. REGISTRAR required in X-ray Department. Whole-time, non-resident appointment for 1 year in first instance, under supervision of Consultant, will include teaching and some work in Mass X-ray, both within and outside the Hospital. Hospital may be visited by direct appointment.

Application forms obtainable from, and returnable to, Group Secretary, Central Middlesex Group Hospital Management Committee, Acton-lane, N.W.10, by 8th March, 1955.

**BETHNAL GREEN HOSPITAL, Cambridge Heath-road,** London, E.2. (309 Beds.) 2 HOUSE SURGEONS. Posts recognised for F.R.C.S. and pre-registration purposes.

Applications, stating age, nationality, qualifications and experience, with copies of 2 testimonials, to the Hospital Secretary.

**CHARING CROSS HOSPITAL GROUP. Full-time** REGISTRAR (resident) in the Department of Psychological Medicine. Duties in Charing Cross Psychiatric Unit at Wembley Hospital, involving modern physical treatments and psychotherapy for inpatients; also the running of a Child Guidance Clinic and outpatient work at Charing Cross and Wembley Hospitals.

Applications, on forms obtainable from the undersigned, to be submitted by 12th March, 1955.

FRANK HART, House Governor and Secretary to the Board.
Charing Cross Hospital, Strand, W.C.2.

**COLINDALE HOSPITAL, Colindale-avenue, London,** N.W.9. (Tuberculosis only—300 Beds.) NORTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD. SURGICAL REGISTRAR (whole-time), resident or non-resident, required in the Thoracic Surgical Unit at above Hospital. Hospital may be visited by direct appointment with Physician-Superintendent.

Application forms obtainable from, and returnable to, Group Secretary, Hendon Group Hospital Management Committee, Edgware General Hospital, Edgware, Middlesex, by 8th March, 1955.

**GUY'S HOSPITAL, S.E.1. Applications are invited for** the post of OPHTHALMIC HOUSE SURGEON (post-registration), non-resident, for a period of 6 months from 1st April.

Applications (1 copy), accompanied by 2 testimonials, should be sent to the Superintendent, Guy's Hospital, S.E.1, on or before 15th March, 1955.

**GUY'S HOSPITAL, S.E.1. Applications are invited for** the appointment of CHIEF ASSISTANT in the Neurological Department (whole-time, Senior Registrar grade). Duties to commence on 11th April, 1955, or as soon as possible thereafter. The appointment will be made for the period ending 30th September, 1956, in the first instance.

Forms of application are obtainable from the Superintendent, Guy's Hospital, and should be forwarded with the names of 2 referees, not later than 17th March, 1955.

**GUY'S MAUDSLEY NEUROSURGICAL UNIT. Applications** are invited for the post of SENIOR HOUSE OFFICER for 6 months commencing 1st April, 1955. The Unit, which is housed in the Maudsley Hospital, serves Guy's Hospital and the Bethlem Royal Hospital and the Maudsley Hospital.

Applications to—

K. J. JOHNSON, House Governor and Secretary,
Denmark-hill, London, S.E.5.

**HAMMERSMITH HOSPITAL AND INSTITUTE OF** OBSTETRICS AND GYNÆCOLOGY, Ducane-road, London, W.12. HOUSE OFFICER (obstetrics) required 1st May. Post recognised for M.R.C.O.G.

Applications, stating age, qualifications, experience, copies of 2 recent testimonials, to Secretary, Board of Governors by 8th March.

**HAMMERSMITH HOSPITAL AND POSTGRADUATE** MEDICAL SCHOOL, Ducane-road, London, W.12. 5 HOUSE PHYSICIANS (general medicine) required 1st May, 2 of these posts will give experience in neurology and rheumatism.

Applications, stating age, qualifications, experience, copies of 2 recent testimonials, to Secretary, Board of Governors, by 7th March.

**HAMMERSMITH HOSPITAL AND POSTGRADUATE** MEDICAL SCHOOL, Ducane-road, London, W.12. Whole-time NON-RESIDENT REGISTRAR (general surgery) required 1st May.

Applications, stating age, qualifications, experience, names of 2 referees, to Secretary, Board of Governors, by 10th March.

**HAMPSTEAD GENERAL HOSPITAL, The Green, N.W.3.** (ROYAL FREE HOSPITAL GROUP.) Applications are invited from registered medical practitioners for the post of RESIDENT CASUALTY OFFICER (graded as Senior House Officer). Salary £745 p.a. Vacant 1st April, 1955, tenable for a period of 6 months at the main Outpatients Department, Bayham-street, N.W.1.

Application forms may be obtained from the Secretary, to whom they should be returned, together with copies of 3 recent testimonials, by 4th March, 1955.

**HOSPITAL OF ST. JOHN AND ST. ELIZABETH,** 60, Grove End-road, London, N.W.8. Applications are invited from registered medical practitioners (Male) for the appointment of HOUSE SURGEON, to become vacant on Monday, 7th March, 1955. Appointment will be for a period of 6 months. Salary is at the rate of £350–£400 p.a., according to posts previously held.

Applications should reach the Secretary on or before Tuesday, 1st March, 1955, together with copies of 3 recent testimonials.

**MIDDLESEX HOSPITAL, W.1. Applications are invited** for the post of Full-time SENIOR REGISTRAR at the Arthur Stanley Institute for Rheumatic Diseases of The Middlesex Hospital; the post provides for 8 sessions at the Arthur Stanley Institute and 3 sessions in the Physical Medicine Department of The Middlesex Hospital. Candidates should have completed a Senior Registrarship in General Medicine.

Further particulars are obtainable from the Administrator, The Arthur Stanley Institute, Peto-place, N.W.1, to whom applications, with the names of 3 referees, should be sent by 12th March, 1955.

**MILE END HOSPITAL, Bancroft-road, London, E.1.** (475 Beds.) SENIOR HOUSE OFFICER (Anæsthetist), resident or non-resident. Post vacant 1st April, 1955.

Application forms, obtainable from the Physician-Superintendent, to be returned by 4th March, 1955, with copies of not more than 3 testimonials.

**KING'S COLLEGE HOSPITAL, Denmark-hill, S.E.5.** Applications are invited for the post of SENIOR REGISTRAR or REGISTRAR in Dermatology, depending on qualifications and experience. The appointment, which is subject to the terms and conditions of service for medical and dental staffs, will be tenable until 30th September, 1955, in the first instance, and is subject to reappointment.

Applications, stating age, education, qualifications and experience, with the names of 2 referees, should be sent to the undersigned by 11th March, 1955.

S. W. BARNES, House Governor.

**KING EDWARD MEMORIAL HOSPITAL, Ealing, W.13.** NORTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD. ANÆSTHETIC REGISTRAR (whole-time), resident, required 20th April, 1955. Staff includes Registrar and Senior House Officer Anæsthetists. Post recognised for D.A. and F.F.A.R.C.S. examinations. Hospital may be visited by direct appointment.

Application forms obtainable from, and returnable to, Group Secretary, West Middlesex Hospital, Isleworth, by 8th March, 1955.

**LAMBETH HOSPITAL, Brook-drive, Kennington, S.E.11.** Applications are invited from pre-registration and registered medical practitioners for the post of RESIDENT HOUSE PHYSICIAN, vacant 1st April, 1955.

Forms of application from the Physician-Superintendent. Stamped addressed envelope should be enclosed.

**LAMBETH HOSPITAL, Kennington, S.E.11.** Applications are invited from pre-registration and registered medical practitioners for the posts (2) of RESIDENT HOUSE SURGEON in the Obstetric and Gynæcological Department. Appointments for 6 months, commencing 11th April, 1955, and on 16th April, 1955, respectively. The Hospital is recognised for the M.R.C.O.G. and D.Obst.R.C.O.G.

Forms of application from the Physician-Superintendent on receipt of stamped addressed envelope.

**NATIONAL HOSPITALS FOR NERVOUS DISEASES.** Applications are invited from registered medical practitioners for the appointment of HOUSE SURGEON at The National Hospital, Queen-square, W.C.1. This post carries the grade of Registrar.

Applications, giving the names of 3 referees, to be sent to the undersigned not later than 19th March, 1955.

H. EWART MITCHELL, Secretary to the Board of Governors.

The National Hospitals for Nervous Diseases,
Queen-square, W.C.1.

**NEW END HOSPITAL, Hampstead, London, N.W.3.** MEDICAL REGISTRAR required for Department of Endocrinology. A general hospital of 230 Beds, special Department for Endocrinology. The Hospital may be visited by direct appointment with the Surgeon-Superintendent.

Application forms obtainable from and returnable to, the Secretary, Archway Group Hospital Management Committee, 46, Cholmeley-park, London, N.6, by 7th March, 1955.

**NEW END HOSPITAL, London, N.W.3. Applications are** invited for the following appointments :—

SENIOR HOUSE OFFICER (general medicine).
*HOUSE PHYSICIAN (general medicine).
HOUSE PHYSICIAN (endocrinology).
*Preference will be given to pre-registration candidates.

Candidates are invited to visit the Hospital by arrangement.

Detailed applications, with copies of 2 recent testimonials and the name of 1 referee, to Surgeon-Superintendent by 7th March, 1955.

**NORTH LONDON BLOOD TRANSFUSION CENTRE,** Deansbrook-road, EDGWARE. JUNIOR HOSPITAL MEDICAL OFFICERS for full-time duties with mobile teams at donor sessions. Opportunity for training in clinical pathology exists.

Applications, giving age, qualifications, experience, and names of 2 referees, to Director not later than 12th March, 1955.

**NORTH MIDDLESEX HOSPITAL, Edmonton, N.18.** SENIOR HOUSE OFFICER (resident) for Psychiatric Unit. The Unit is complete from every point of view and includes a small observation ward and is run in association with St. Bartholomew's Hospital and Claybury Hospital. The appointment, which is recognised for the D.P.M., and offers admirable opportunities for a young physician anxious to specialise in psychological medicine, is for 6 months from 1st April with possible extension to 1 year (LOCUM required from 18th March).

Applications, stating age, nationality, qualifications, experience, with copies of recent testimonials and/or names of 2 referees, to Secretary of Hospital, by 7th March.

**PRINCESS BEATRICE HOSPITAL, Earls Court, S.W.5.** CASUALTY OFFICER (Senior House Officer grade), some anæsthetic duties, resident.

Applications immediately, stating age, qualifications with 3 testimonials, to House Governor.

**ROYAL LONDON HOMŒOPATHIC HOSPITAL, W.C.1.** NORTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD. MEDICAL REGISTRAR required at above Hospital. Whole-time, non-resident. Candidates should have knowledge of homœopathic therapeutics. Hospital may be visited by direct appointment.

Application forms obtainable from, and returnable to, Secretary, Royal London Homœopathic Hospital Management Committee, Great Ormond-street, W.C.1, by 14th March, 1955.

**SOUTH LODGE HOSPITAL, World's End-lane, N.21.** ENFIELD GROUP HOSPITAL MANAGEMENT COMMITTEE. HOUSE OFFICER (first, second, or third post) not pre-registration. Resident. General duties as directed by the Medical Superintendent. National Health Service salary plus £50 p.a. Vacant 1st May, 1955.

Applications, with the names and addresses of 2 referees, to the Group Secretary, Chase Farm Hospital, The Ridgeway, Enfield, Middlesex.

**PADDINGTON GREEN CHILDREN'S HOSPITAL, W.2.** (ST. MARY'S HOSPITAL.) Applications are invited for the post of CASUALTY OFFICER (post-registration appointment), House Officer grade, tenable for 6 months, as from 1st April, 1955.

Applications, stating age, nationality, qualifications with dates, and experience, with copies of 3 recent testimonials, should reach the Secretary not later than 5th March, 1955.

**ST. BARTHOLOMEW'S HOSPITAL, London, E.C.1.** Applications are invited for a post of REGISTRAR in the Department of Anæsthesia (to work at Hill End Hospital, St. Albans) commencing on 1st May, 1955. The Registrar is required to live near Hill End Hospital, or could be resident there.

Applications, with the names of 3 referees, should be sent to the undersigned by 10th March, 1955.

C. C. CARUS-WILSON, Clerk to the Governors.

**ST. GEORGE'S HOSPITAL, S.W.1. Applications are** invited for 2 posts in the grade of REGISTRAR, to the Department of General Surgery. Candidates should hold the Diploma of the F.R.C.S. (Eng.). The appointments will be for 1 year in the first instance. The first of these appointments will be made as soon as possible, and the second early in May, 1955.

Applications, giving details of age, education, qualifications, experience, and the names of 2 referees, should reach the undersigned not later than 12th March, 1955.

P. H. CONSTABLE, House Governor.

**ST. JAMES' HOSPITAL, Balham, S.W.12. Wandsworth** HOSPITAL GROUP. SOUTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD. REGISTRAR (physical medicine). Post vacant May. Department of Physical Medicine is a modern department and will shortly also include hydrotherapy.

Application forms (send stamped addressed foolscap envelope) obtainable from Group Secretary at above address to be completed and returned by 5th March.

**ST. MARY'S HOSPITAL, W.2. Applications are invited** for the post of Part-time REGISTRAR to the E.N.T. Department for 2 notional half-days per week. The successful candidate will be required to take up his duties as soon as possible.

Applications, stating nationality, date of birth, permanent address, qualifications, with dates, details and National Health Service gradings of previous and present appointments, together with the names and addresses of 3 referees, should reach ALAN POWDITCH, House Governor, not later than 10th March, 1955.

**ST. STEPHEN'S HOSPITAL, Chelsea, S.W.10. House** PHYSICIAN (resident), general medicine and some tuberculosis. Vacant 1st March.

Applications, naming 2 referees, to Medical Superintendent.

**THE HOSPITAL FOR SICK CHILDREN, Great Ormond-**street, London, W.C.1. There will be a vacancy on 15th June, 1955, for a HOUSE PHYSICIAN (Senior House Officer).

Further particulars and form of application, which must be returned not later than 28th March, 1955, are obtainable from the undersigned.

H. F. RUTHERFORD, House Governor and Secretary.

**THE HOSPITAL FOR SICK CHILDREN, Great Ormond-**street, London, W.C.1. There is a vacancy for a Part-time SENIOR REGISTRAR to the Ophthalmic Department, attending for 1 session per week on Thursday afternoons.

Further particulars and form of application, which must be returned not later than Monday, 28th March, 1955, are obtainable from the undersigned.

H. F. RUTHERFORD, House Governor and Secretary.

**THE HOSPITAL FOR SICK CHILDREN, Great Ormond-**street, London, W.C.1. There will be a vacancy on 29th June, 1955, for a RESIDENT DENTAL HOUSE SURGEON (Senior House Officer). The post is recognised for the Fellowship in Dental Surgery, Royal College of Surgeons. Experience is given in both oral surgery and orthodontics.

Further particulars and form of application, which must be returned not later than 28th March, 1955, are obtainable from the undersigned.

H. F. RUTHERFORD, House Governor and Secretary.

**UNIVERSITY COLLEGE HOSPITAL, Gower-street,** W.C.1. Applications are invited for the post of MEDICAL REGISTRAR. Post will be graded Registrar or Senior House Officer according to the experience of the successful candidate.

Applications, with names of 2 referees, to Administrator and Secretary by 11th March, 1955.

**UNIVERSITY COLLEGE HOSPITAL, Gower-street,** W.C.1. Applications are invited for the post of RESIDENT ASSISTANT OBSTETRIC SURGEON (graded Senior Registrar). Salary £1100–£1400 p.a., less £125 p.a. for residence. Candidates should be members of the Royal College of Obstetricians and Gynæcologists.

Applications, with names of 2 referees, to the Administrator and Secretary by 11th March, 1955.

**WHITTINGTON HOSPITAL, London, N.19. North West** METROPOLITAN REGIONAL HOSPITAL BOARD. SURGICAL REGISTRAR required at above Hospital. Unit consists of general surgical beds with large Gastro-enterological Section. F.R.C.S. desirable. Hospital may be visited by appointment with Medical Superintendent.

Application forms obtainable from, and returnable to, Group Secretary, Archway Group Hospital Management Committee, 46, Cholmeley-park, N.6.

**WOOLWICH GROUP HOSPITAL MANAGEMENT COM-**MITTEE. Locum Tenens SENIOR REGISTRAR in Radiology. Whole-time for approximately 6 months.

Apply to Group Secretary, Memorial Hospital, Woolwich, S.E.18 (WOOlwich 2670).

**ASHTON, HYDE AND GLOSSOP HOSPITAL MANAGE-**MENT COMMITTEE. SENIOR HOUSE OFFICER (general surgery) required.

Apply, stating age, nationality, qualifications, and experience, with copies of 2 references, to Group Secretary, Ashton-under-Lyne General Hospital, Ashton-under-Lyne, Lancs.

**ABERDEEN ROYAL MENTAL HOSPITAL.** Medical Staff required.

1 JUNIOR HOSPITAL MEDICAL OFFICER. Salary and conditions as per Health Service scale (£775—£50—£1075, less £150 for board, &c.).

2 HOUSE OFFICERS (fully registered). Salary £525, less £125 for board, &c.

Applications with details to Physician-Superintendent, Royal Mental Hospital, Cornhill-road, Aberdeen.

**ASCOT. HEATHERWOOD ORTHOPÆDIC HOSPITAL.** (212 Beds—Adults and Children.) ORTHOPÆDIC REGISTRAR (resident) required at above Hospital. Hospital a regional centre for all general orthopædic conditions; there is also a large amount of outpatient work. Post recognised for F.R.C.S. Candidates may visit Hospital by direct appointment.

Application forms obtainable from, and returnable to, Group Secretary, Windsor Group Hospital Management Committee, Alma-road, Windsor, by 13th March.

**ASHFORD HOSPITAL, Ashford, Middlesex. Staines** GROUP HOSPITAL MANAGEMENT COMMITTEE. Required, RESIDENT SENIOR HOUSE OFFICER (Male) for Tuberculosis Unit of 56 Beds with some outpatient work. Post vacant 14th March, 1955.

Applications, stating age, qualifications, and experience, with copies of up to 3 recent testimonials, to Medical Director of Hospital.

**AYLESBURY, BUCKINGHAMSHIRE. STOKE MANDEVILLE** HOSPITAL. (609 Beds.) RESIDENT HOUSE PHYSICIAN for Department of Medicine, vacant 3rd April, 1955. Recognised pre-registration post; applications from registered practitioners will be considered.

Apply, with copies of 2 testimonials, to Administrative Officer.

**AYLESBURY, BUCKINGHAMSHIRE. STOKE MANDEVILLE** HOSPITAL. (609 Beds.) HOUSE PHYSICIAN for the Paediatric Department. The post qualifies for D.C.H. Duties will include care of children in Infectious Diseases Unit, Plastic Unit, and Outpatient Department, Royal Buckinghamshire Hospital. Recognised pre-registration post; applications from registered practitioners will be considered. Post vacant from 23rd March. Interview Wednesday, 9th March.

Apply, with copies of 2 testimonials, to Administrative Officer.

**AYLESBURY, BUCKINGHAMSHIRE. TINDAL** GENERAL HOSPITAL. (206 Beds.) HOUSE SURGEON (E.N.T.), Male or Female, vacant 21st March. New department with high turnover and 4 outpatient clinics weekly. Recognised for D.L.O. and F.R.C.S. No casualty department. Pre-registration post, but registered practitioners invited to apply.

Please apply, with 2 testimonials, to the Administrative Officer, as soon as possible.

**BEDFORD GENERAL HOSPITAL. (437 Beds.) North** WEST METROPOLITAN REGIONAL HOSPITAL BOARD. REGISTRAR required for busy acute Orthopædic and Traumatic Department at the above Hospital. Previous orthopædic experience desirable. Candidates may visit Hospital by appointment with the Group Secretary. Post vacant end of March.

Application form obtainable from, and returnable to, Group Secretary, Bedford Group Hospital Management Committee, 3, Kimbolton-road, Bedford, by 2nd March, 1955.

**BEDFORD GENERAL HOSPITAL. (437 Beds.) Locum** RESIDENT REGISTRAR (obstetrics and gynæcology) required on 3rd March, pending permanent appointment. Maternity Unit 61 Beds, Gynæcological Unit 26 Beds. Salary £17 10s. per week.

Applications, stating age, nationality, qualifications, previous appointments, together with copies of 2 recent testimonials, should be forwarded to Group Secretary, Bedford Group Hospital Management Committee, 3, Kimbolton-road, Bedford.

**BIRMINGHAM AND MIDLAND EAR AND THROAT** HOSPITAL, Edmund-street, BIRMINGHAM, 3. Required, SENIOR HOUSE OFFICER or HOUSE OFFICER (including pre-registration), according to experience.

Detailed applications, with copies of 2 recent testimonials, to the Secretary, Dudley Road Hospital, Birmingham, 18.

**BIRMINGHAM. HIGHCROFT HALL MENTAL HOSPITAL,** ERDINGTON, BIRMINGHAM, 23. JUNIOR HOSPITAL MEDICAL OFFICER (resident or non-resident). Salary £775–£1075 p.a. There will be scope for work in the use of modern psychiatric methods in the wards.

Applications to Medical Superintendent.

**BIRMINGHAM (near). MARSTON GREEN MATERNITY** HOSPITAL, Berwicks-lane, MARSTON GREEN, near BIRMINGHAM. HOUSE SURGEON (obstetrics), vacant 1st May, 1955. 121 obstetric and 10 gynæcological beds. Recognised for Diploma and Obstetric part of Membership of Royal College of Obstetricians and Gynæcologists. Premature Baby Unit. Affiliated to Birmingham Medical School for training of students.

Detailed applications, with copies of 3 recent testimonials, to Hospital Secretary.

**BIRMINGHAM REGIONAL HOSPITAL BOARD.**

(1) **Dudley, Stourbridge and District Hospital Group, The Guest Hospital, Dudley** (154 Beds)

REGISTRAR in General Surgery for Guest Hospital. Experience specialty essential. Higher qualifications desirable. Resident.

(2) **Birmingham (Selly Oak) Hospital Management Committee, Oak Tree-lane, Birmingham, 29**

ANÆSTHETIC REGISTRAR for Selly Oak Hospital, Birmingham, 29 (1059 Beds). Resident/non-resident. Exceptional opportunities for reading for higher qualification.

REGISTRAR in Pathology for Birmingham Accident Hospital, Bath-row, Birmingham, 15. Previous experience essential. Higher qualification desirable. Experience available in haematology, including blood-transfusion, bacteriology, biochemistry, and morbid anatomy. Details from Consultant Pathologist.

Application forms from Group Secretaries, to be returned before 14th March, 1955. Candidates may visit hospitals.

**BIRMINGHAM, 9. LITTLE BROMWICH HOSPITAL.** SENIOR HOUSE OFFICER in Infectious Diseases. Opportunities for study of infectious diseases. Part of Hospital being developed as General Hospital, where further experience can be gained.

Apply Physician-Superintendent.

**BIRMINGHAM, 9. LITTLE BROMWICH HOSPITAL.** HOUSE OFFICER for surgical and gynæcological wards. Recognised for pre-registration.

Apply Physician-Superintendent.

**BIRMINGHAM. SOLIHULL HOSPITAL. Senior House** OFFICER (obstetrics and gynæcology), vacant end of April. Previous experience desirable.

Applications, with names of referees, to Medical Superintendent.

**BIRMINGHAM (SANATORIA) GROUP HOSPITAL** MANAGEMENT COMMITTEE. YARDLEY GREEN HOSPITAL—THORACIC SURGICAL UNIT. Applications are invited for the post of SENIOR HOUSE OFFICER or HOUSE OFFICER according to experience. The appointment will give broad opportunities for experience in both tuberculous and non-tuberculous thoracic surgery.

Applications stating age qualifications, training and experience, together with copies of 3 recent testimonials, should be addressed to the Group Secretary, Yardley Green Hospital, Birmingham, 9.

**BIRMINGHAM. THE UNITED BIRMINGHAM HOSPITALS.** Applications are invited for the post of RESIDENT ANÆSTHETIST (Senior House Officer grade) for duties within the Teaching Group, and resident at the General Hospital or at the Queen Elizabeth Hospital. The post will be vacant on 1st April, 1955, and is tenable for 1 year. The appointment is recognised for the purpose of taking the F.F.A.R.C.S. examination.

Application forms may be obtained from the Secretary, United Birmingham Hospitals, Queen Elizabeth Hospital, Birmingham, 15, and should be returned to him as soon as possible.

**BIRMINGHAM. THE UNITED BIRMINGHAM HOSPITALS.** Applications are invited for the post of REGISTRAR in Radiodiagnosis (non-resident), Registrar grade, for duties in the United Hospitals. Possession of the D.M.R.D. would be an advantage.

Application forms may be obtained from the Secretary, United Birmingham Hospitals, Queen Elizabeth Hospital, Birmingham, 15, and should be returned to him as soon as possible.

**BIRMINGHAM. THE UNITED BIRMINGHAM HOSPITALS.** THE CHILDREN'S HOSPITAL, Ladywood-road, BIRMINGHAM, 16. Applications are invited for the appointment of RESIDENT SENIOR HOUSE OFFICER (Clinical pathology) vacant on 1st May, 1955, for 1 year. Applicants should have held resident appointments in a children's hospital or a children's department of a general hospital. The successful applicant will be required to work in the Clinical Pathological Department.

Forms of application may be obtained from the House Governor and should be returned by 19th March, 1955.

G. A. PHALP, Secretary to the Board of Governors.

**BIRMINGHAM. THE UNITED BIRMINGHAM HOSPITALS.** THE CHILDREN'S HOSPITAL, Ladywood-road, BIRMINGHAM, 16. SENIOR HOUSE OFFICER (casualty) required to commence duty on 15th March, 1955, or before. Previous surgical experience essential.

Forms of application may be obtained from the House Governor, and should be returned immediately.

G. A. PHALP, Secretary to the Board of Governors.

**BISHOP AUCKLAND. THE GENERAL HOSPITAL.** (350 Beds.) SOUTH WEST DURHAM HOSPITAL MANAGEMENT COMMITTEE. Applications are invited from registered practitioners or pre-registration candidates for the post of HOUSE SURGEON (general surgery—72 Beds). Immediate vacancy.

Apply, naming 2 referees, to—

K. G. T. LUXFORD, Esq., Secretary/Finance Officer.

The General Hospital, Bishop Auckland.

**BISHOP'S STORTFORD, HERTFORDSHIRE. HAYMEADS** HOSPITAL. (Midway between London and Cambridge—Main Line from Liverpool Street.) Applications are invited for post of SENIOR HOUSE OFFICER (pathology), resident. Appointment to commence in April for period of 1 year. Salary £745, less £130 p.a. in respect of residential emoluments.

Applications, stating qualifications, nationality, age and experience, with copies of recent testimonials or names of 2 referees, to Hospital Secretary.

**BLACKPOOL. VICTORIA HOSPITAL. (344 Beds.)** HOUSE SURGEON (casualty and orthopædics). Post now vacant. Recognised for 6 months casualty training for Final F.R.C.S. examination and for Pre-registration Service. Main duties in the Casualty and Orthopædic Departments. This is a busy General Hospital with a large Outpatient Department and the post provides excellent opportunities for gaining experience.

Applications, with references, to the Hospital Secretary.

**BROMLEY GROUP HOSPITAL MANAGEMENT COMMITTEE.** SENIOR HOUSE OFFICER in Anæsthetics (qualified minimum 1 year) for duty at Group hospitals, residing at Bromley Hospital, required immediately for 6 months (may be renewed). Recognised for D.A. and F.F.A.R.C.S. Deduction for residence £150 p.a.

Apply, naming 3 referees, to Administrative Officer, Bromley Hospital, Bromley, Kent.

**BRIGHTON. SUSSEX EYE HOSPITAL, Eastern-road,** BRIGHTON, 7. (56 Beds.) SENIOR HOUSE SURGEON (Senior House Officer) and HOUSE SURGEON (House Officer) required mid-April. Posts recognised for F.R.C.S. under 23 (b).

Applications, stating age, qualifications and experience, together with the names of 2 referees, to the Administrative Officer.

**BRIGHTON AND LEWES HOSPITAL MANAGEMENT** COMMITTEE GROUP OF HOSPITALS. HOUSE SURGEON required in the E.N.T. Department of the above Group, vacant in March. Recognised for F.R.C.S. and D.L.O.

Applications, with details of experience, age, and qualifications, and naming 2 referees, to be sent to the Administrative Officer, Royal Sussex County Hospital, Brighton, 7.

**BRADFORD. ST. LUKE'S HOSPITAL. Senior House** OFFICER (general medicine and clinical pathology), vacant 1st April. Salary £745 p.a., less £150 p.a. residential emoluments.

Applications, stating age, nationality, qualifications and experience with copy testimonials, to Secretary, Bradford Royal Infirmary.

**BRADFORD. ST. LUKE'S HOSPITAL. Locum Senior** HOUSE OFFICER (general medicine/pathology) required 1st April–31st July, 1955. Salary £14 10s. per week, less £150 p.a. residential emoluments.

Applications, stating age, experience, nationality, and qualifications, with copy testimonials, to Secretary, Bradford Royal Infirmary.

**BRISTOL CLINICAL AREA. The Board of Governors** OF THE UNITED BRISTOL HOSPITALS AND THE SOUTH-WESTERN REGIONAL HOSPITAL BOARD. Applications are invited by the above Boards from registered medical practitioners for the joint appointment of SENIOR REGISTRAR in Psychiatry at the Bristol Mental Hospitals. Applicants should have had wide experience in psychiatry. The appointment will be held for 1 year in the first instance but may be renewed thereafter on an annual basis. The post offers considerable opportunities for clinical work and research in all branches of adult psychiatry.

Applications, stating date of birth, qualifications and experience, together with the names and addresses of 2 referees, should be sent to the Secretary of the Regional Hospital Board, 27, Tyndalls Park-road, Bristol, 8, not later than 9th March, 1955.

**BRISTOL. HAM GREEN HOSPITAL, Pill, near Bristol.** Applications are invited for the post of RESIDENT ASSISTANT PHYSICIAN in the Infectious Diseases Department (350 Beds) of this Hospital. The Hospital contains a major Poliomyelitis Unit, a Tuberculous Meningitis Treatment Centre, and offers wide experience in acute medicine. Salary and conditions on Junior Hospital Medical Officer scale (subject to a residential deduction of £135 p.a.). Previous experience essential. Post vacant April, 1955.

Applications, stating age, qualifications, &c., to the Resident Physician.

**BURY ST. EDMUNDS. WEST SUFFOLK GENERAL** HOSPITAL. (289 Beds.) SENIOR HOUSE OFFICER for casualty and orthopædic duties required early May. Post recognised for F.R.C.S.

Inquiries and applications to Hospital Secretary.

**CAERPHILLY DISTRICT MINERS' HOSPITAL, near** CARDIFF. (175 Beds for acute medicine and surgery.) HOUSE SURGEON (pre-registration appointment) required at above Hospital. Married quarters available.

Apply to the Group Secretary, Rhymney and Sirhowy Valleys Hospital Management Committee.

**CAMBRIDGE. ADDENBROOKE'S HOSPITAL. House** SURGEON for 6 months from 17th April. Recognised Pre-registration Service.

Apply, stating age, nationality, qualifications, and experience with dates, and copies of 3 testimonials, to the Secretary by 9th March. Interviews 16th March.

**CARDIFF. ST. DAVID'S HOSPITAL. (656 Beds.)** CARDIFF HOSPITAL MANAGEMENT COMMITTEE. SENIOR HOUSE OFFICER (resident) required 9th April, 1955, in Acute medical wards to work under direction of Consultants.

Application form from Group Secretary, Cardiff Hospital Management Committee, 44, Cathedral-road, Cardiff.

**CARMARTHEN. WEST WALES GENERAL HOSPITAL.** (188 Beds. Recognised by the Royal College of Surgeons and for Pre-registration Service.) WEST WALES HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the post of RESIDENT HOUSE OFFICER (surgical). Salary £425, £475, and £525 p.a., according to experience, less £125 p.a. for residential emoluments. Vacancy mid-March.

Applications, stating age, qualifications, experience, and nationality, with names and addresses of 3 referees, to the Group Secretary, West Wales Hospital Management Committee, Glangwili, Carmarthen.

**CARSHALTON, SURREY. QUEEN MARY'S HOS-**PITAL FOR CHILDREN. (General Children's Hospital of 818 Beds.) Whole-time ANÆSTHETIC REGISTRAR. The surgical practice of the Hospital includes emergency, orthopædic, E.N.T. and general surgery and there is a special Surgical Unit in association with the Hospital for Sick Children, Gt. Ormond-street. The post is recognised by the Faculty of Anæsthetists. Applicants are invited to visit the Hospital by appointment with the Physician-Superintendent.

Applications, on forms obtainable from the Group Secretary, should be submitted by 12th March. 1955.

**CARSHALTON, SURREY. QUEEN MARY'S HOS-**PITAL FOR CHILDREN. (General Children's Hospital of 818 Beds.) Whole-time REGISTRAR required for surgical and orthopædic duties. Position vacant at the end of May. Applicants are invited to visit the Hospital by appointment with the Physician-Superintendent.

Applications, on forms obtainable from the Group Secretary, should be submitted by 26th March, 1955.

**CANTERBURY. KENT AND CANTERBURY HOS-**PITAL. (276 Beds.) The post of GENERAL SURGICAL AND UROLOGICAL HOUSE SURGEON (pre-registration, first, second, or third post), which is recognised for the F.R.C.S., becomes vacant in early April, 1955. National Health Service salary and conditions.

Applications, together with copies of 2 recent testimonials, to be addressed to the Hospital Secretary at the above Hospital.

**CANTERBURY. KENT AND CANTERBURY HOS-**PITAL. (276 Beds.) Applications are invited for the post of SENIOR HOUSE OFFICER (casualty) which becomes vacant at the end of March next. Salary £745 p.a. Recognised for the F.R.C.S.

Applications to be sent to the Hospital Secretary at the above Hospital, together with copies of 3 recent testimonials.

**CHELMSFORD AND ESSEX HOSPITAL. Applications** are invited for the resident post of CASUALTY OFFICER (Senior House Officer). It is recognised for the F.R.C.S. and offers excellent experience in the treatment of fractures and diagnosis of acute medical and surgical emergencies. Opportunity is given for Casualty Officer to follow up his cases in the wards and to obtain operating experience in major theatre under the guidance of the Consultants or the Resident Surgical Officer. Off duty time is generous and the post is one likely to suit both an officer seeking a higher qualification in surgery or one intending General Practice. The vacancy will occur on 1st April. Salary £745 p.a., with £130 deducted for residential emoluments.

Apply Secretary, Chelmsford Hospital Management Committee, Chelmsford and Essex Hospital, Chelmsford.

**CHERTSEY, SURREY. ST. PETER'S HOSPITAL** (late Botleys Park War Hospital). (430 Beds.) Required, RESIDENT HOUSE SURGEON (pre-registration) for the Gynæcological (30 Beds) and E.N.T. (16 Beds) Departments. Salary in accordance with terms and conditions of National Health Service.

Applications, together with names and addresses of referees, to be sent to the Physician-Superintendent as soon as possible.

**CHERTSEY, SURREY. ST. PETER'S HOSPITAL** (late Botleys Park War Hospital). (430 Beds.) ORTHOPÆDIC HOUSE SURGEON required from 23rd April. Senior House Officer or House Officer (Intern) grade. Post recognised for F.R.C.S. or for pre-registration internship. Preference will be given to provisionally registered candidates. Salary in accordance with terms and conditions of National Health Service.

Applications, together with names and addresses of referees, to be sent to the Physician-Superintendent as soon as possible.

**CHESTER. DEVA MENTAL HOSPITAL, Liverpool-**road. JUNIOR HOSPITAL MEDICAL OFFICER required. Salary scale £775–£50–£1075 p.a. Accommodation available for single person. All forms of modern treatment given and psychiatric outpatient clinics staffed at local general hospitals. Study facilities provided.

Apply Medical Superintendent.

**COLCHESTER. BRITISH LEGION SANATORIUM,** NAYLAND, COLCHESTER, ESSEX. (207 Beds for treatment of early pulmonary tuberculosis in women.) IPSWICH GROUP HOSPITAL MANAGEMENT COMMITTEE. Applications invited for the appointment of SENIOR HOUSE OFFICER. No married quarters available. Deduction for residential emoluments £150 p.a.

Applications, with 2 testimonials, to the Physician-Superintendent.

**COLCHESTER HOSPITAL MANAGEMENT COM-**MITTEE. Applications are invited for the following posts :—

**Clacton and District Hospital, Clacton-on-Sea** (58 Beds)

SENIOR HOUSE OFFICER (Resident Surgical Officer). Post tenable for 1 year.

**Harwich and District Hospital, Dovercourt** (30 Beds)

SENIOR HOUSE OFFICER. Duties mainly surgical, but there is a proportion of medical beds. In addition there are surgical, medical, E.N.T. outpatients and casualty work. Post tenable for 1 year.

Applications, with copies of 3 testimonials, to the Group Secretary, 14, Pope's-lane, Colchester, Essex.

**CUPAR, FIFE. STRATHEDEN HOSPITAL. Applications** are invited for the appointment of :—

JUNIOR HOSPITAL MEDICAL OFFICER

SENIOR HOUSE OFFICER

This Mental Hospital (1025 Beds) provides experience in all branches of psychiatry. There are adult outpatient and child psychiatric clinics covering the County of Fife. A modern hospital with operating theatre provides facilities for the practice of the latest treatment.

Applications, giving personal particulars, qualifications and experience, together with names and addresses of 2 referees, to be submitted to the Physician-Superintendent.

**DARLINGTON MEMORIAL HOSPITAL. (210 Beds.)** Applications are invited for the post of RESIDENT HOUSE SURGEON (approved pre-registration appointment) which post is recognised for the F.R.C.S. (Eng.). Salary in accordance with national scale.

Apply, giving age and references, to the undersigned forthwith.

G. W. BECKWITH, Group Secretary.

**DERBY. DERBYSHIRE ROYAL INFIRMARY. House** SURGEON (pre-registration) (gynæcology), vacant 10th March, 1955. Recognised for M.R.C.O.G.

Applications, stating full details, with copies of 2 recent testimonials, should be sent as soon as possible to Hospital Secretary.

**DEWSBURY, YORKSHIRE. STAINCLIFFE GENERAL** HOSPITAL, Healds-road.

HOUSE OFFICERS :—

(1) General Surgery.

(2) Obstetrics and Gynæcology.

Vacant 1st May, 1955, and tenable for 6 months. Recognised pre-registration appointments. The Hospital has a Surgical Unit of 52 Beds. Casualty duty is shared with other House Officers. The Obstetrical and Gynæcological Units have 37 and 24 Beds respectively.

Applications, with full details, and quoting this journal, to the Administrative Officer at the Hospital.

**DONCASTER ROYAL INFIRMARY.** (330 Beds.) DONCASTER HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the post of HOUSE SURGEON (Senior House Officer). Post recognised for F.R.C.S.

Applications to the Secretary to the Committee at Doncaster Royal Infirmary.

**DUDLEY, STOURBRIDGE AND DISTRICT HOSPITAL** GROUP. BIRMINGHAM REGION.

**The Guest Hospital, Dudley** (154 Beds)

SENIOR HOUSE OFFICER (surgical).

SENIOR HOUSE OFFICER (casualty).

HOUSE OFFICER (surgical), pre-registration. Post now vacant.

**Wordsley Hospital, near Stourbridge** (478 Beds)

SENIOR HOUSE OFFICER (anæsthetics). Resident. Previous experience house appointments essential. Experience available general surgery, gynæcology, orthopædics, plastic surgery unit.

SENIOR HOUSE OFFICER (surgical).

Applications, stating age, experience, with copies of 3 recent testimonials, to Group Secretary, The Guest Hospital, Dudley, Worcs.

**ELLESMERE PORT HOSPITAL.** Applications are invited for the post of RESIDENT SURGICAL OFFICER (Junior Hospital Medical Officer). Accommodation suitable for a married practitioner is available at a reasonable rental.

Applications, giving full details together with the names and addresses of 2 referees, should be forwarded to the Group Secretary, XIII Chester and District Hospital Management Committee, 5, King's-buildings, Chester.

**EPSOM, SURREY. LONG GROVE HOSPITAL** (for mental and nervous disorders). (2300 Beds.) SOUTH WEST METROPOLITAN REGION. Applications are invited for an appointment as Whole-time PSYCHIATRIC REGISTRAR. The Hospital affords opportunities for experience of all modern methods of investigation and treatment. There is an extensive outpatients service and facilities are given to study for the D.P.M. (The Hospital is approved for the Conjoint D.P.M.)

Forms of application may be obtained from the Secretary and should be returned to him not later than 2 weeks after the appearance of this advertisement. Candidates will be welcome to visit the Hospital by appointment with the Physician-Superintendent.

**GLASGOW, N.1. STOBHILL GENERAL HOSPITAL.** Applications are invited for the post of JUNIOR HOSPITAL MEDICAL OFFICER in the Acute Geriatric Unit (70 Beds/for assessment and rehabilitation) supervised by a Consultant Physician specialising in geriatrics. The appointment offers excellent clinical experience in the diagnosis and treatment of acute and other illnesses in the elderly, and will be for 2 years in the first instance.

Applications, stating age, qualifications and experience, with the names of 2 referees, to be sent to the Medical Superintendent.

**HAROLD WOOD HOSPITAL, Harold Wood, Essex (near** London). (415 Beds.) SENIOR HOUSE OFFICER (Pædiatrics), required mid-March. Main general and casualty hospital of Brentwood Group. Recognised for D.C.H. Salary £745 p.a., less £130 p.a. for board and lodging.

Apply to Hospital Secretary (Tel. : Ingrebourne 2881).

**HASTINGS. ROYAL EAST SUSSEX HOSPITAL.** (150 Beds.) HOUSE SURGEON (resident) required. Pre-registration post, vacant 3rd March, 1955. National scale of salary.

Apply to Hospital Administrator.

**HITCHIN, HERTFORDSHIRE. LISTER HOSPITAL.** Applications are invited for the post of RESIDENT HOUSE SURGEON, vacant 7th March, 1955. Recognised as pre-registration post.

Applications, stating age, nationality, qualifications, and experience, together with copies of 3 recent testimonials, to be sent to the Medical Administrator as soon as possible.

**HITCHIN HOSPITALS, Hitchin, Hertfordshire.** Applications are invited for the post of RESIDENT HOUSE SURGEON, now vacant.

Applications, stating age, nationality, qualifications and experience, together with copies of 3 recent testimonials, to be sent to the Medical Administrator as soon as possible.

**HOUNSLOW (GENERAL) HOSPITAL, Staines-road,** HOUNSLOW, MIDDLESEX. (81 Beds.) RESIDENT CASUALTY OFFICER (Senior House Officer grade) required at above Hospital. Post recognised for F.R.C.S. Post vacant 13th March, 1955.

Applications, with testimonials, &c., to Hospital Secretary.

**HULL. VICTORIA HOSPITAL FOR SICK CHILDREN,** Park-street. HULL A GROUP HOSPITAL MANAGEMENT COMMITTEE. RESIDENT SENIOR HOUSE OFFICER required as from 1st April, 1955. The Officer appointed will supervise the House staff, and also be in charge of the Casualty Department. Salary £745 p.a. Emoluments £155 p.a.

Applications, with testimonials, to be sent to the Hospital Secretary.

**HULL. VICTORIA HOSPITAL FOR SICK CHILDREN,** Park-street. HULL A GROUP HOSPITAL MANAGEMENT COMMITTEE. Locum SENIOR HOUSE OFFICER required for 2 weeks from 26th February and possibly longer on a weekly basis.

Applications, giving full details, to be sent to the Hospital Secretary.

**KEIGHLEY AND DISTRICT VICTORIA HOSPITAL,** KEIGHLEY, YORKSHIRE. (138 Beds.) RESIDENT HOUSE SURGEON (either sex) (general surgery, orthopædics, E.N.T.). Post recognised under F.R.C.S. regulations. First, second, or third post. Vacant 21st March, 1955. Approved pre-registration appointment. Tenable for 6 months.

Applications, with full particulars as to age, nationality, qualifications and experience and copies of recent testimonials, to be sent to Group Secretary, St. John's Hospital, Fell-lane, Keighley.

**ILFORD ISOLATION HOSPITAL, Grove-road, Chadwell** HEATH, ESSEX. There is a vacancy for the position of RESIDENT MEDICAL OFFICER (chest diseases) (Junior Hospital Medical Officer status) at the above Hospital of 69 Beds. Salary £775 (for an officer appointed not less than 2 years after registration as a medical practitioner)–£50–£1075 p.a. The Officer appointed would be expected to work under the general direction of the Chest Physician, Ilford, and to undertake some duties at Ilford Chest Clinic as may be directed by the Chest Physician.

Applications, stating age, qualifications and previous experience, together with recent testimonials, should be sent to the undersigned within 7 days of the appearance of this advertisement.

H. F. HARRIS, Group Secretary,
Ilford and Barking Group Hospital Management Committee.
King George Hospital, Ilford.

**ILFORD. KING GEORGE HOSPITAL.** There is a vacancy for a SENIOR HOUSE OFFICER ANÆSTHETIST at the above Hospital. The Officer appointed will be required to be available for duty in other hospitals in the Group. Salary will be at the rate of £745 p.a., less £145 p.a. emoluments.

Applicants should have been registered not less than 1 year, and should send applications, accompanied by copies of 3 testimonials, to the undersigned within 7 days of the appearance of this advertisement.

H. F. HARRIS, Secretary.
Ilford and Barking Group Hospital Management Committee.
King George Hospital, Ilford.

**IPSWICH BOROUGH GENERAL HOSPITAL, Heath-**road, IPSWICH. (270 Beds.) Applications are invited for the post of SENIOR HOUSE OFFICER (Fracture and Orthopædic Department). The post, which becomes vacant on 3rd March, 1955, is normally of 1 years duration. It is recognised as part of the necessary surgical experience for the Final F.R.C.S.

Applications, stating age, qualifications and experience, together with recent testimonials, to the Hospital Secretary.

**IPSWICH. EAST SUFFOLK AND IPSWICH HOS-**PITAL. (360 Beds.) Applications are invited for the post of HOUSE SURGEON to the Fracture and Orthopædic Department. Approved pre-registration post.

Applications, with copies of recent testimonials, to the Hospital Secretary.

**KINGSTON HOSPITAL, Kingston-on-Thames. Group** LABORATORY. SENIOR HOUSE OFFICER in Pathology required in this large group laboratory where excellent opportunities exist for good basic training.

Applications should be sent immediately to Group Pathologist.

**KIRKCALDY GENERAL HOSPITAL.** (74 surgical beds.) 2 HOUSE OFFICERS required, 1 for immediate appointment and 1 to commence duty as at 1st April, 1955. Both posts qualify for pre-registration.

Apply, with copies of 2 recent testimonials, to the Medical Superintendent, East Fife Hospitals Board of Management, 243A, High-street, Kirkcaldy.

**LEEDS, 2. PUBLIC DISPENSARY AND HOSPITAL.** LEEDS A GROUP HOSPITAL MANAGEMENT COMMITTEE. Applications are invited from registered medical practitioners for the appointment of CASUALTY OFFICER (Senior House Officer) at the above Hospital. The appointment will be for a period of 1 year. Salary in accordance with the agreed terms and conditions of service of hospital medical and dental staffs, with an appropriate deduction in respect of board, lodging, &c.

Applications, stating age, qualifications, experience, &c., together with the names of 2 referees, to be forwarded to the undersigned as soon as possible.

J. FOLKARD, Secretary to the Committee.
Administrative Offices, St. James's Hospital, Leeds, 9.

**LEEDS REGIONAL HOSPITAL BOARD** invites applications for the following REGISTRAR posts :—

*General Medicine*

Regional Rheumatism Centre, Harrogate (240 Beds) (9 sessions), and the Rheumatism Clinic, General Infirmary at Leeds (2 sessions). Resident at Royal Bath Hospital, Harrogate.

*General Surgery*

(*a*) Wakefield A and B Groups. Duties mainly at the Clayton Hospital, Wakefield (75 surgical beds) (non-resident).

(*b*) Victoria Hospital, Keighley (55 surgical beds) (preferably resident). Recognised for F.R.C.S.

*Ophthalmology*

Halifax and Bradford A Hospital Management Committee Groups. Duties divided equally between Halifax Group (11 eye beds—1800 new outpatients annually) and Bradford A (34 eye beds—5800 new outpatients annually).

*Orthopædic Surgery*

(*a*) St. James's Hospital, Leeds (64 orthopædic beds) and the Public Dispensary, Leeds (non-resident).

(*b*) Hull A Group (50 orthopædic beds), Hull B Group and East Riding Group (50 orthopædic beds) (non-resident). Includes some duties in the Casualty Department at the Hull Royal Infirmary.

Applications, stating age, qualifications and details of appointments held showing dates, with names and addresses of 3 referees, to the Secretary, Joint Registrars Committee, Park-parade, Harrogate, not later than 10th March, 1955.

**LEEDS REGIONAL HOSPITAL BOARD** invites applications for the post of SENIOR REGISTRAR in Psychiatry. 5 sessions as Trainee Specialist in Child Psychiatry at the University Department of Psychiatry at the General Infirmary at Leeds and the remainder of the time in mental deficiency at the Westwood Hospital, Bradford, and associated colonies. Accommodation available for a single person. May be non-resident, in which case the person appointed should reside in Bradford. Candidates must hold the D.P.M. or equivalent qualification.

Applications, stating age, qualifications and details of appointments held showing dates, with names and addresses of 3 referees, to the Secretary, Joint Registrars Committee, Park-parade, Harrogate, not later than 17th March, 1955.

**LEEDS A GROUP HOSPITAL MANAGEMENT COMMITTEE.** Applications are invited from registered medical practitioners for the appointment of SENIOR HOUSE OFFICER (obstetrics and gynæcology) for duties mainly at St. James's Hospital. The appointment which is recognised by the R.C.O.G. for training for the Membership and Diploma in Obstetrics examinations, will be for a period of 1 year. Salary in accordance with the agreed terms and conditions of service of hospital medical and dental staffs—namely, £745 p.a., with an appropriate deduction in respect of board, lodging and other services provided.

Applications, stating age, qualifications, experience, &c., together with names of 2 referees, to be forwarded to the undersigned as soon as possible.

J. FOLKARD, Secretary to the Committee.

Administrative Offices, St. James's Hospital, Leeds, 9.

**LEEDS (near). MENSTON (MENTAL) HOSPITAL.** Applications invited for whole-time appointments as (*a*) SENIOR HOUSE OFFICER; (*b*) JUNIOR HOSPITAL MEDICAL OFFICER. Facilities available for training in all branches of psychiatry in conjunction with Department of Psychiatry, Leeds University. Salaries in accordance with terms and conditions of service of hospital medical and dental staffs. Residential accommodation for single persons.

Applications to Physician-Superintendent, stating age, civil state, qualifications, experience, and names and addresses of 2 referees.

**LEEDS. THE UNITED LEEDS HOSPITALS. The** GENERAL INFIRMARY AT LEEDS. SENIOR REGISTRAR in Thoracic Surgery required. The successful candidate will work in the Department of Thoracic Surgery at the General Infirmary and may be required to undertake some duties at regional hospitals. Salary according to Whitley Council scale.

Applications, giving details of age, qualifications, posts held with dates, with 3 names for reference, should be sent to the Sub-Dean, School of Medicine, Leeds, 2, by not later than 12th March, 1955.

**LEICESTER ISOLATION HOSPITAL AND CHEST** UNIT, Groby-road, LEICESTER. (328 Beds.) Applications are invited for the appointment of RESIDENT SENIOR HOUSE OFFICER (surgical). Salary £745 p.a., less £150 p.a. residential emoluments. The appointment is tenable for 6 months and may be extended for a further period of 6 months. Experience will be gained in all branches of thoracic surgery, including cardiac surgery.

Applications, giving age, qualifications, dates, &c., and copies of 2 recent testimonials, to be forwarded as soon as possible to the Physician-Superintendent at the above Hospital.

**LIVERPOOL. THE UNITED LIVERPOOL HOSPITALS.** LIVERPOOL REGIONAL HOSPITAL BOARD. Applications are invited for a post of SENIOR REGISTRAR in Obstetrics and Gynæcology for the period to 30th September, 1955, with duties in the first instance at the Liverpool Maternity Hospital.

Apply by 12th March, 1955, on forms obtainable from the Secretary, The United Liverpool Hospitals, 80, Rodney-street, Liverpool, 1.

**LIVERPOOL. WALTON HOSPITAL. Senior House** OFFICER in Psychiatry (resident or non-resident). Previous psychiatric experience not required. The Psychiatric Department of this General Hospital has a large Outpatient Department and the post provides a basic psychiatric training and is recognised for D.P.M.

Applications, stating age, qualifications and experience with names of 2 referees, should be sent to the Physician-Superintendent, Walton Hospital, Liverpool, 9.

**LOUTH, LINCOLNSHIRE. COUNTY INFIRMARY. (214** Beds.) GRIMSBY HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the resident post of SENIOR HOUSE OFFICER (medical) which will become vacant on 30th April at this General Hospital.

Applications, giving full details, together with the names of 2 referees, should be addressed to the Hospital Secretary.

**MANCHESTER REGIONAL HOSPITAL BOARD.**

(*a*) SENIOR REGISTRAR in Psychiatry, Oldham and District Group of hospitals (228 psychiatric beds). Duties include attendance at Consultant Psychiatric clinics and participation in treatment of inpatients and outpatients at hospitals in the Group and possibly at Prestwich Mental Hospital, near Manchester (3020 Beds), either concurrently with other duties or whole-time for not more than 1 year during period of employment.

(*b*) SENIOR REGISTRAR in General Surgery in the North Manchester Group of hospitals, mainly at Crumpsall (General) Hospital (1200 Beds). Arrangements may later be made for the successful applicant to transfer to the United Manchester Hospitals to continue training.

Application forms from the Senior Administrative Medical Officer to the Board, Cheetwood-road, Manchester, 8, to be returned by 7th March, 1955.

**MANCHESTER REGIONAL HOSPITAL BOARD. South** MANCHESTER HOSPITAL MANAGEMENT COMMITTEE. The Board invite applications from registered practitioners for the post of REGISTRAR (radiotherapy) at the Christie Hospital and Holt Radium Institute.

Applications, stating age, qualifications, present post, experience, and names of 2 referees, to be forwarded to the Group Secretary, Withington Hospital, Manchester, 20, immediately.

**MANCHESTER REGIONAL HOSPITAL BOARD. North** AND MID-CHESHIRE HOSPITAL MANAGEMENT COMMITTEE. Locum REGISTRAR (chest diseases) required to carry out duties arranged by the Consultant Chest Physician at the Altrincham, Northwich, Crewe Chest Clinics and Hefferston Grange Sanatorium, from March to September, 1955, inclusive.

Applications, together with 2 recent testimonials, should be sent to the Group Secretary, North and Mid-Cheshire Hospital Management Committee, The Hospital, Sinderland-road, Altrincham, Cheshire.

**MANCHESTER REGIONAL HOSPITAL BOARD. Blackburn** AND DISTRICT HOSPITAL MANAGEMENT COMMITTEE. RESIDENT REGISTRAR (obstetrics/gynæcology) required 1st April, 1955. Post recognised for M.R.C.O.G. Based on Queen's Park Hospital, Blackburn (a general hospital with 83 obstetric/gynæcological beds) with duties at Blackburn Royal Infirmary and Accrington Victoria Hospital. Accommodation for married man and small family may be available, if required.

Application forms obtainable from, and returnable to, the Secretary, Hospital Management Committee Office, Royal Infirmary, Blackburn.

**MANCHESTER REGIONAL HOSPITAL BOARD. North** AND MID-CHESHIRE HOSPITAL MANAGEMENT COMMITTEE. ST. ANNE'S E.N.T. HOSPITAL, BOWDON, CHESHIRE. (53 Beds.) REGISTRAR required (preferably resident).

Applications to be forwarded, with 2 recent testimonials, to the Group Secretary, The Hospital, Sinderland-road, Altrincham, Cheshire, not later than 10th March, 1955.

**MANCHESTER REGIONAL HOSPITAL BOARD. Salford** HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the post of NON-RESIDENT REGISTRAR in E.N.T. Surgery in the above Group with main duties at Hope and the Royal Manchester Children's Hospitals.

Applications, together with copies of 2 recent testimonials, to be sent to the Group Secretary, Salford Royal Hospital, Salford, 3, before 5th March, 1955.

**MANCHESTER. MONSALL HOSPITAL, Newton Heath,** MANCHESTER, 10. SENIOR HOUSE OFFICER required (resident) for infectious diseases wards.

Applications, with names of 2 referees, to Group Secretary, Booth Hall Hospital, Manchester, 9, from whom further particulars may be obtained.

**MANCHESTER. UNITED MANCHESTER HOSPITALS.** MANCHESTER ROYAL INFIRMARY, MANCHESTER, 13. SENIOR HOUSE OFFICER (surgical) to commence on 1st June, 1955. Whole-time, non-resident training post, tenable for 6 months, renewable for a second 6 months. Duties allotted in Orthopædic, Surgical Outpatients and General Surgical Units in rotation.

Application form obtainable from the undersigned, to be returned by 16th March, 1955. G. H. TAYLOR, Secretary.

**MANCHESTER. UNITED MANCHESTER HOSPITALS.** MANCHESTER ROYAL EYE HOSPITAL. Applications are invited for SENIOR HOUSE OFFICER post. Salary £745 p.a., less £155 p.a. for residential emoluments.

Application forms may be obtained from the undersigned.

H. R. NORTH, General Superintendent.

**MANCHESTER. UNITED MANCHESTER HOSPITALS.** SAINT MARY'S HOSPITALS, MANCHESTER. Applications are invited for the post of HOUSE OFFICER in Gynæcology. Applicants must have had previous hospital experience in medicine and surgery. The post is recognised for the purposes of the M.R.C.O.G. examination. The appointment is for 6 months starting 1st April, 1955. Salary in accordance with national scale.

Application forms may be obtained from the undersigned and returned not later than 4th March, 1955.

A. R. WISE, General Superintendent.

Saint Mary's Hospitals, Whitworth Park, Manchester, 13.

**MANCHESTER. WEST MANCHESTER HOSPITAL** MANAGEMENT COMMITTEE. PARK HOSPITAL, DAVYHULME. (General Hospital—433 Beds.) The following Staff are required:

1 RESIDENT SENIOR HOUSE OFFICER (pathology). Post vacant end of May, 1955.

1 HOUSE OFFICER (pædiatrics), post-registration, for new post commencing 1st April, 1955. The Hospital has a Midwifery Unit of 73 Beds and there are also thoracic surgery beds on the Pædiatric Unit. Hospital recognised for training for Diploma in Child Health.

Forms from Secretary.

**MANCHESTER, 20. WITHINGTON HOSPITAL. South** MANCHESTER HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the post of RESIDENT CLINICAL PATHOLOGIST (Senior House Officer grade), vacant on 14th March, 1955. Previous experience in pathology not essential the post affording opportunities for gaining experience in all branches of clinical pathology.

Applications, stating age, qualifications, present post, experience, and names of 2 referees, to be forwarded immediately to—

A. H. KEATES, Group Secretary.

Withington Hospital, Manchester, 20.

**MANCHESTER. WYTHENSHAWE HOSPITAL. South** MANCHESTER HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the following posts at the above Hospital:—

(1) RESIDENT CLINICAL PATHOLOGIST (Senior House Officer grade).

(2) RESIDENT SENIOR HOUSE OFFICER (surgical).

(3) RESIDENT SENIOR HOUSE OFFICER (anæsthetics).

Applications, stating age, qualifications, present post, experience, and names of 2 referees, to be forwarded immediately to the Group Secretary, Withington Hospital, Manchester, 20.

**MAIDENHEAD HOSPITAL, St. Luke's-road, Maidenhead.** Applications are invited for the post of GENERAL PRACTITIONER CLINICAL ASSISTANT in Ophthalmology involving 1 half-day per week on a Tuesday morning. Recent experience in ophthalmology essential. Salary under review by Whitley Council—at present £175 p.a. per weekly half-day.

Application forms obtainable from, and returnable to, Group Secretary, Windsor Group Hospital Management Committee, Alma-road, Windsor, by 6th March.

**NOTTINGHAM CHILDREN'S HOSPITAL. (136 Beds.** Recognised for the D.C.H.) Applications are invited for the post of RESIDENT HOUSE PHYSICIAN (pre-registration) which falls vacant at the end of April. The post is tenable for 6 months.

Applications, with copies of 2 testimonials, should be sent to the Secretary, Nottingham Children's Hospital, Chestnut-grove, Nottingham.

**NOTTINGHAM CHILDREN'S HOSPITAL.** (136 Beds. Recognised for the D.C.H.) Applications are invited for the post of RESIDENT SENIOR HOUSE OFFICER (surgical) which is vacant at the end of March. The post is tenable for 6 months or a year by agreement.

Applications, with copies of 2 testimonials, should be sent to the Secretary, Nottingham Children's Hospital, Chestnut-grove, Nottingham.

**NOTTINGHAM GENERAL HOSPITAL.** Applications are invited from registered medical practitioners for the post of SENIOR HOUSE OFFICER (orthopædic and fracture). The post offers exceptional experience in traumatic surgery. Duties to commence as soon as possible.

Applications, stating age, qualifications, and experience, together with copies of testimonials, to be sent to the Group Secretary.

**NOTTINGHAM GENERAL HOSPITAL.** Applications are invited from registered medical practitioners for the post of SENIOR ORTHOPÆDIC AND FRACTURE HOUSE OFFICER; duties to commence on 1st April, 1955. The post offers exceptional experience in traumatic surgery. Salary and conditions of service in accordance with Ministry regulations.

Applications, stating age, qualifications, and experience, together with copies of testimonials, to be sent to the Group Secretary.

**NEWCASTLE. THE UNITED NEWCASTLE UPON** TYNE HOSPITALS. Applications are invited for the whole-time, non-resident appointment of SENIOR REGISTRAR to the Department of Psychological Medicine at the Royal Victoria Infirmary, under the clinical direction of the Professor of Psychological Medicine. Applicants should possess either a Diploma in Psychological Medicine or a higher qualification in general medicine, and psychiatric experience. The appointment is for 1 year in the first instance and will be subject to the terms and conditions of service of hospital medical staff in the National Health Service.

Applications, giving full details and the names and addresses of 3 referees, should be sent to the undersigned within 2 weeks of the appearance of this advertisement.

A. W. SANDERSON, House Governor and Secretary.
Royal Victoria Infirmary, Newcastle upon Tyne.

**NEWMARKET GENERAL HOSPITAL.** (330 Beds.) EAST ANGLIAN REGIONAL HOSPITAL BOARD. ANÆSTHETIC REGISTRAR. Post recognised for D.A. Appointment for 1 year, renewable for second year.

Applications, stating age experience, and names of 3 referees, to Secretary of Board, 117, Chesterton-road, Cambridge, by 7th March, 1955. Candidates invited to visit Hospital by direct arrangement with Physician-Superintendent at the Hospital.

**NEWPORT, MONMOUTHSHIRE. ROYAL GWENT** HOSPITAL. (260 Beds, 10 residents. Recognised F.R.C.S.) SENIOR HOUSE OFFICER required for Casualty Department towards end of March. This is the base Hospital in the Group and all medical and surgical emergencies are admitted through casualty, which is under the full-time charge of a Senior Hospital Medical Officer, there being also 2 Senior House Officers. A new Department with excellent facilities and accommodation has recently been opened. Post recognised F.R.C.S. for 6 months and tenable 6 or 12 months as desired. Salary £745, less £125 board-residence.

Write, quoting 2 referees, to T. A. JONES, Group Secretary. 64, Cardiff-road, Newport, Mon.

**NEWTON ABBOT HOSPITAL, S. Devon. Senior House** OFFICER (medicine), Male or Female, required approximately 4th March, 1955. Duties divided equally between 20 acute medical beds in general section and 140 geriatric beds. This Officer is also required to stand in when Senior House Surgeon otherwise engaged. Married quarters available.

Applications, stating qualifications, nationality, and age, with copy testimonials, to be sent to the Group Secretary, Torquay District Hospital Management Committee, 62/64, East-street, Newton Abbot, S. Devon.

**NORTH GLOUCESTERSHIRE CLINICAL AREA. The** BOARD OF GOVERNORS OF THE UNITED BRISTOL HOSPITALS AND THE SOUTH-WESTERN REGIONAL HOSPITAL BOARD. Applications are invited by the above Boards from registered medical practitioners for the joint appointment of REGISTRAR in Obstetrics and Gynæcology. The appointment, which is resident, will be held for 1 year in the first instance, and be renewable for a further year. The successful candidate will be appointed to work for the first year at the City Maternity Hospital and at the Gloucestershire Royal Hospital, Gloucester. The post is recognised for the M.R.C.O.G.

Applications, stating date of birth, qualifications and experience, together with the names and addresses of 2 referees, should be sent to the Secretary of the Regional Hospital Board, 27, Tyndalls Park-road, Bristol, 8, not later than 9th March, 1955.

**NORTHWOOD, MIDDLESEX. MOUNT VERNON** CENTRE FOR PLASTIC SURGERY. MOUNT VERNON HOSPITAL, NORTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD. SENIOR REGISTRAR required. Applicants to be in possession of a higher surgical qualification and to have at least 4 years postgraduate experience in medicine or surgery. The post is held in the first instance for 1 year, but is subject to confirmation at the end of 6 months. The Hospital may be visited by direct appointment.

Application forms obtainable from, and returnable to, the Secretary, Harefield and Northwood Group Hospital Management Committee, Mount Vernon Hospital, Northwood, Middlesex, by 8th March, 1955.

**PONTEFRACT AND CASTLEFORD HOSPITAL MAN-** AGEMENT COMMITTEE. JUNIOR HOSPITAL MEDICAL OFFICER to assist Geriatric Physician in hospitals of this and Wakefield A Hospital Management Committee—new appointment. Accommodation available.

Applications to Secretary, Gt. Northern House, Salter-row, Pontefract, Yorks., not later than 2nd March, 1955.

**PLYMOUTH. SOUTH DEVON AND EAST CORNWALL** GENERAL HOSPITAL GROUP.

**Department of Obstetrics and Gynæcology**

HOUSE SURGEON in Obstetrics and Gynæcology, vacant 17th April, 1955. Recognised for the Membership of the Royal College of Obstetricians and Gynæcologists. Wide experience can be obtained in obstetrics, including antenatal and postnatal clinics.

Applications, stating age, nationality, qualifications and experience, with names of 3 referees, to be sent to—

ARTHUR R. CASH, Group Secretary.
7, Nelson-gardens, Stoke, Plymouth.

**PONTYPOOL AND DISTRICT HOSPITAL, Pontypool,** MON. (116 Beds.) JUNIOR HOSPITAL MEDICAL OFFICER (surgical) required about 1st April. This is the senior resident post and entails duties with the 2 Consultant Surgeons, as well as supervising the other resident staff of 2 House Surgeons and a House Physician. Salary £775–£1075, less £150 board-residence. Excellent experience.

Write, quoting 2 referees, to T. A. JONES, Group Secretary. 64, Cardiff-road, Newport, Mon.

**POOLE GENERAL HOSPITAL, Longfleet-road, Poole.** BOURNEMOUTH AND EAST DORSET HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the appointment of CASUALTY OFFICER (Senior House Officer). The post which becomes vacant on 1st April, 1955, is suitable for persons reading for higher diplomas.

Applications to the Hospital Secretary.

**PORTSMOUTH GROUP HOSPITAL MANAGEMENT** COMMITTEE. Applications are invited for the following appointments:—

GYNÆCOLOGICAL HOUSE SURGEON for duties at Queen Alexandra Hospital (50 gynæcological beds), vacant now. Post recognised for M.R.C.O.G. Pre-registration post. At the end of 6 months successful candidate would be offered post at St. Mary's Hospital, Portsmouth (50 obstetric, 40 gynæcological beds). Recognised for M.R.C.O.G. and D.Obst.R.C.O.G.

**Queen Alexandra Hospital**

HOUSE SURGEON (126 surgery beds) vacant 11th March, 1955. Pre-registration post.

**Royal Portsmouth Hospital**

HOUSE OFFICER required Orthopædic Department (104 Beds) vacant now.

**Saint Mary's Hospital**

SENIOR HOUSE SURGEON required for casualty work and general surgery. Vacant now.

**Infectious Diseases Hospital** (310 Beds—Fever and T.B.) SENIOR HOUSE OFFICER, vacant 1st May.

Applications, stating age, experience and qualifications, together with names of 2 referees, should be forwarded as soon as possible to L. C. ROGERS.
35, Grove-road South, Southsea.

**READING. ROYAL BERKSHIRE HOSPITAL.** (403 Beds.) Applications are invited from registered medical practitioners (Male and Female) for the resident post of JUNIOR HOUSE SURGEON (gynæcology) vacant 1st April, 1955. Post recognised for M.R.C.O.G. and tenable for 6 months. Salary £525, less £125 board-residence.

Write, stating age, qualifications with dates, nationality and present post, with copy of 1 recent testimonial, to Secretary.

**ROCHDALE INFIRMARY. Rochdale and District Hos-** PITAL MANAGEMENT COMMITTEE. HOUSE SURGEON required at the above Infirmary early March. Pre-registration candidates eligible. Post recognised for 6 of the 12 months F.R.C.S. experience.

Apply to Group Secretary, Central Offices, Birch Hill Hospital, Rochdale, Lancs, at once.

**ROMFORD, ESSEX. OLDCHURCH HOSPITAL.** (722 Beds.) SENIOR HOUSE OFFICER in Pathology required in this large general hospital containing well-equipped laboratory where excellent opportunities exist for gaining extensive experience.

Applications should be sent immediately to Group Secretary, Romford Group Hospital Management Committee, Oldchurch Hospital, Romford.

**ROMFORD, ESSEX. OLDCHURCH HOSPITAL.** (722 Beds.) Applications are invited from fully qualified medical practitioners for the appointment of RESIDENT HOUSE SURGEON from 1st April, 1955, in the General Surgical Unit. Recognised for F.R.C.S. This very active unit of approximately 100 beds affords ample opportunity for candidates to obtain first-class tuition and experience.

Applications should be forwarded immediately to Group Secretary at the Hospital.

**ROMFORD, ESSEX. VICTORIA HOSPITAL.** (99 Beds.) RESIDENT HOUSE PHYSICIAN (Male), required from beginning of April next. (Post not approved for pre-registration purposes.)

Applications should be forwarded immediately to the Secretary, Romford Group Hospital Management Committee, Oldchurch Hospital, Romford.

**ROMFORD, ESSEX. VICTORIA HOSPITAL.** (99 Beds.) RESIDENT HOUSE SURGEON (Male), required from 19th April, 1955. (Post not approved for pre-registration purposes.)

Applications should be forwarded immediately to the Secretary, Romford Group Hospital Management Committee, Oldchurch Hospital, Romford.

**SWANSEA. MORRISTON HOSPITAL, Morriston,** SWANSEA. (501 Beds.) GLANTAWE HOSPITAL MANAGEMENT COMMITTEE. Applications are invited from registered medical practitioners for the resident appointment of SENIOR HOUSE OFFICER in the Obstetric and Gynæcological Department of the above Hospital.

Applications, stating age, qualifications and experience, should be addressed to the Medical Superintendent of the Hospital.

**RAMSGATE GENERAL HOSPITAL.** (101 Beds.) SENIOR HOUSE OFFICER (surgical). Recognised for F.R.C.S. and D.A. Salary £745 p.a., less charge for residential emoluments.

Applications, with copies of testimonials, to Hospital Secretary.

**SALISBURY GENERAL HOSPITAL. Salisbury Group** HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the post of RESIDENT HOUSE SURGEON (Orthopædic Department) which becomes vacant at the end of April, 1955. The Department has 35 Beds and a large outpatient turnover.

Applications, stating age, nationality, qualifications, experience, and naming 2 referees, to the Group Secretary, Odstock Hospital, Salisbury.

**SCOTLAND. EASTERN REGIONAL HOSPITAL BOARD.** Obstetrics and Gynæcology. DUNDEE TEACHING HOSPITALS. Applications are invited for the post of REGISTRAR (resident) in Obstetrics and Gynæcology in the establishment for Dundee Royal Infirmary (510 Beds) and Maryfield Hospital, Dundee (400 Beds), both general teaching hospitals associated with the University of St. Andrews and recognised for M.R.C.O.G. Applicants should have held house appointments in obstetrics and gynæcology and have had experience in general medicine and surgery. Salary and conditions of service in accordance with national agreement.

Forms of application and further particulars from the Secretary to the Board, 430, Blackness-road, Dundee, with whom applications must be lodged not later than 12th March, 1955.

**SCOTLAND. EASTERN REGIONAL HOSPITAL BOARD.** ASHLUDIE HOSPITAL, MONIFIETH, DUNDEE. Thoracic Surgery. Applications are invited for the appointment of SENIOR REGISTRAR in Thoracic Surgery at Ashludie Hospital, Monifieth, near Dundee (222 Beds), which contains the Regional Thoracic Surgical Unit of 66 Beds for tuberculous and non-tuberculous cases. Higher surgical qualification and previous experience in thoracic surgery essential; additional experience in general or chest medicine an advantage. Salary and conditions of service in accordance with national agreement.

Forms of application and further particulars from the Secretary to the Board, 430, Blackness-road, Dundee, with whom applications must be lodged not later than 12th March, 1955.

**SCOTLAND. NORTH-EASTERN REGIONAL HOSPITAL BOARD.** Applications are invited for the post of SENIOR REGISTRAR in Obstetrics and Gynæcology—main duties in Aberdeen General and Aberdeen Special Hospitals. Candidates should have experience in their specialty and preferably hold an appropriate higher qualification.

Applications, giving 2 names for reference, should be submitted by 12th March, 1955, to the Secretary, 1, Albyn-place, Aberdeen, from whom further particulars may be obtained.

**SCOTLAND. NORTHERN REGIONAL HOSPITAL BOARD** invite applications for a post of SENIOR HOUSE OFFICER under the Joint Training Scheme in Hospital and General Practice, in which the Board and the Executive Council for the County of Inverness are associated. The Scheme provides a combined training of 2 years duration for young medical practitioners intending to enter medical practice or a specialty. Concurrent experience in hospital and general practice is given in various departments of the hospitals at Inverness and with selected general practitioners in the town and surrounding district. The post is non-resident and the salary is £745 p.a.

Candidates should apply by 19th March, 1955, on forms obtainable from the undersigned, by whom further particulars will be supplied on request.

A. M. FRASER, M.D.,
Secretary and Administrative Medical Officer.
Office of the Northern Regional Hospital Board,
Raigmore, Inverness.

**SCOTLAND. SOUTH-EASTERN REGIONAL HOSPITAL BOARD.** Applications are invited for the appointment of REGISTRAR in Tuberculosis with the Edinburgh Royal Victoria and Associated Hospitals. The post is associated with the Department of Tuberculosis and Diseases of the Respiratory System, University of Edinburgh, and the holder will be expected to undertake teaching duties and assist in research. The appointment is subject to the National Health Service regulations.

Applications, giving particulars of age, qualifications, and previous experience, together with the names of 2 referees, should be submitted to the Secretary, South-Eastern Regional Hospital Board, Scotland, 11, Drumsheugh-gardens, Edinburgh, by 19th March, 1955.

**SHEFFIELD REGIONAL HOSPITAL BOARD.** Temporary NON-RESIDENT SENIOR REGISTRAR (radiotherapy) required at the Sheffield National Centre for Radiotherapy, to fill a vacancy during the present incumbent's period of national service. Appointment for initial period of 1 year, which may be extended to 2 years. Applicants should possess D.M.R.T.

Apply to Secretary, Sheffield Regional Hospital Board, Old Fulwood-road, Sheffield, by 14th March, 1955, giving age, nationality, qualifications, present and previous appointments with dates, date available, and naming 3 referees.

**SHEFFIELD REGIONAL HOSPITAL BOARD.** Whole-time NON-RESIDENT SENIOR REGISTRAR (obstetrics and gynæcology) for the Nottingham Hospital for Women. Candidates should preferably be members of the Royal College of Obstetricians and Gynæcologists. Work of this Hospital is mainly gynæcological but 27 beds for abnormal obstetric cases. Appointment for 1 year in the first instance reviewable annually. It has been agreed between the Sheffield Regional Hospital Board and the Board of Governors of United Sheffield Hospitals that subject to satisfactory work and progress the tenure of the appointment will be divided between the Nottingham Hospital for Women and the Jessop Hospital for Women, Sheffield.

Apply to Secretary, Sheffield Regional Hospital Board, Old Fulwood-road, Sheffield, by 7th March, 1955, giving age, nationality, qualifications, present and previous appointments with dates, naming 3 referees.

**SHEFFIELD REGIONAL HOSPITAL BOARD.** Whole-time NON-RESIDENT SENIOR REGISTRAR in Radiology required on 12th April, for approximately 9 notional half-days per week at the City General Hospital, Sheffield, and approximately 2 notional half-days per week at the Barnsley Hospitals. Candidates should hold a Diploma in Diagnostic Radiology. Appointment for 1 year in the first instance reviewable annually. It has been agreed between the Sheffield Regional Hospital Board and the Board of Governors of the United Sheffield Hospitals that subject to satisfactory work and progress the tenure of the appointment will be divided between the City General Hospital, Sheffield, and Barnsley Hospitals and the Teaching Hospitals of the United Sheffield Hospitals.

Apply to Secretary, Sheffield Regional Hospital Board, Old Fulwood-road, Sheffield, by 14th March, 1955, giving age, nationality, qualifications, present and previous appointments with dates, naming 3 referees.

**SHEFFIELD. LODGE MOOR HOSPITAL FOR INFECTIOUS DISEASES.** (467 Beds.) SHEFFIELD REGIONAL HOSPITAL BOARD. SHEFFIELD NO. 3 HOSPITAL MANAGEMENT COMMITTEE. Applications are invited from registered medical practitioners for the post of RESIDENT SENIOR HOUSE OFFICER. Candidates should have held a resident appointment in a hospital. Salary £745 p.a. (subject to a deduction of £150 p.a. for residential emoluments). The appointment is normally for 1 year subject to 1 months notice either side.

Applications, stating age, qualifications, &c., to the Group Secretary, Sheffield No. 3 Hospital Management Committee, Lodge Moor Hospital, Sheffield, 10.

**SHEFFIELD No. 1 HOSPITAL MANAGEMENT COMMITTEE.** Locum SENIOR HOUSE OFFICER (general medicine) required for duties at the City General Hospital and Fir Vale Infirmary. Post vacant now until approximately the middle of July. Remuneration at the rate of £14 10s. per week with a deduction of £2 10s. per week for residence.

Apply, naming 2 referees, to the Group Secretary at Nether Edge Hospital, Sheffield, 11.

**SHEFFIELD. THE UNITED SHEFFIELD HOSPITALS.** ROYAL HOSPITAL UNIT. Applications invited from registered medical practitioners for the post of RESIDENT SENIOR HOUSE OFFICER in Anæsthetics at the above Hospital. Post vacant 4th March, 1955.

Applications, stating age, qualifications, and experience, with the names of 3 referees (or enclosing copy testimonials), should be sent immediately to the Superintendent, Royal Hospital, West-street, Sheffield, 1.

**SHEFFIELD. WHARNCLIFFE HOSPITAL.** (192 Beds.) SHEFFIELD REGIONAL HOSPITAL BOARD. Whole-time SURGICAL REGISTRAR required with duties also in the Orthopædic Department. Single accommodation if required. Appointment for 1 year in first instance.

Apply to Secretary, Sheffield Regional Hospital Board, Old Fulwood-road, Sheffield, by 7th March, 1955, giving age, nationality, qualifications, present and previous appointments with dates, naming 3 referees.

**SIDCUP, KENT. QUEEN MARY'S HOSPITAL. Sidcup** AND SWANLEY HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the post of SENIOR HOUSE OFFICER (orthopædics). Salary £745 p.a. The post, which will be vacant from 1st April, 1955, offers good facilities for experience in this specialty and is recognised for the examinations of the Royal College of Surgeons. The Hospital is situated in pleasant surroundings, and is within half-an-hour's travelling time of London.

Applications to the Secretary, Queen Mary's Hospital, Sidcup, Kent.

**SLOUGH, BUCKINGHAMSHIRE. UPTON HOSPITAL.** WINDSOR GROUP HOSPITAL MANAGEMENT COMMITTEE. SENIOR HOUSE OFFICER (casualty) required, 1 of 2 for busy Casualty Department. Post vacant immediately. Experience provided in orthopædic and plastic cases.

Applications, stating age and qualifications, together with 2 testimonials, to Hospital Secretary.

**SLOUGH, BUCKINGHAMSHIRE. UPTON HOSPITAL.** WINDSOR GROUP HOSPITAL MANAGEMENT COMMITTEE. HOUSE OFFICER (casualty) required, 1 of 2, for busy Casualty Department. Experience provided in orthopædic and plastic cases.

Applications, stating age and qualifications, together with copies of 2 testimonials, to Hospital Secretary.

**SLOUGH, BUCKINGHAMSHIRE. UPTON HOSPITAL.** WINDSOR GROUP HOSPITAL MANAGEMENT COMMITTEE. Locum HOUSE OFFICER (casualty) required immediately.

Applications, stating age and qualifications, together with 2 testimonials, to Hospital Secretary.

**ST. HELENS AND DISTRICT HOSPITAL MANAGEMENT COMMITTEE.** WHISTON HOSPITAL, PRESCOT. (892 Beds.) Applications are invited for the appointment of Locum ANÆSTHETIST at Whiston Hospital, Prescot, in the Senior House Officer grade.

Applications, stating age, qualifications and experience, to be forwarded immediately to N. RICHARDS, Secretary.

Group Office, Whiston Hospital, Prescot.

**SOUTH EAST METROPOLITAN REGIONAL HOSPITAL BOARD.** Applications are invited for an appointment as Whole-time REGISTRAR in Obstetrics and Gynæcology to fill a vacancy in the approved trainee establishment at the Medway and Gravesend Groups of hospitals. The appointment will be in accordance with the terms and conditions of service of hospital medical and dental staffs (England and Wales), and will be for 1 year in the first instance.

Applications, giving particulars of age, qualifications, and experience, with relevant dates, together with the names and addresses of 2 referees, to be sent to the Secretary, Registrars Committee, South East Metropolitan Regional Hospital Board, 11, Portland-place, W.1, not later than 12th March, 1955.

**SOUTH EAST METROPOLITAN REGIONAL HOSPITAL BOARD.** Applications are invited for an appointment as Whole-time REGISTRAR in General Surgery to fill a vacancy in the approved trainee establishment at the Canterbury, and Isle of Thanet Groups of hospitals. The appointment will be in accordance with the terms and conditions of service of hospital medical and dental staffs (England and Wales), and will be for 1 year in the first instance.

Applications, giving particulars of age, qualifications, and experience with relevant dates, together with the names and addresses of 2 referees, to be sent to the Secretary, Registrars Committee, South East Metropolitan Regional Hospital Board, 11, Portland-place, W.1, not later than 12th March, 1955.

**SHREWSBURY. ROYAL SALOP INFIRMARY AND COPTHORNE HOSPITAL.** (500 Beds.) SHREWSBURY HOSPITAL GROUP. GYNÆCOLOGICAL HOUSE SURGEON. 50 gynæcological beds and 2 House Surgeons. Post recognised for M.R.C.O.G. Vacant 14th March, 1955.

Applications, with copy testimonials, to Group Secretary, Royal Salop Infirmary, Shrewsbury.

**TAPLOW, near MAIDENHEAD. CANADIAN RED CROSS MEMORIAL HOSPITAL.** HOUSE SURGEON required for post vacant 26th March. Preference given to persons seeking pre-registration post.

Applications, stating age, qualifications with dates, with copies of 2 testimonials, to Hospital Secretary.

**WAKEFIELD. PINDERFIELDS GENERAL HOSPITAL. THORACIC UNIT.** Applications invited for the appointment of SENIOR HOUSE SURGEON now available in the Leeds Regional Thoracic Centre (54 Beds) at Pinderfields General Hospital. Salary £745 p.a., less a charge of £155 p.a. for board, lodging, &c.

Address written applications, with full particulars and 2 names and addresses for reference, to—

W. BOWRING, Group Secretary.

Victoria Chambers, Wood-street, Wakefield.

**WELSH REGIONAL HOSPITAL BOARD.**

REGISTRAR (general surgery), Caernarvon and Anglesey General Hospital, Bangor (134 Beds). Resident/non-resident Post recognised for F.R.C.S.

REGISTRAR in Orthopædic Surgery based at Rhyl, to serve Clwyd and Deeside Hospital Management Committee. Also required assist in treatment of long-stay orthopædic cases at area sanatoria.

REGISTRAR (anæsthetics), Mid-Glamorgan Hospital Management Committee, based at Neath General Hospital, Glam. (412 Beds). Hospital recognised for D.A. Resident or non-resident.

Subject to review end of first year.

Application forms from Senior Administrative Medical Officer, Temple of Peace, Cathays Park, Cardiff, within 14 days.

**WEST CORNWALL CLINICAL AREA. South-Western REGIONAL HOSPITAL BOARD.** Applications are invited from registered medical practitioners for the appointment of CLINICAL ASSISTANT in Ophthalmology to undertake 2 weekly sessions in the West Cornwall Group of hospitals. The successful candidate, who will work under the general direction of the Consultant Ophthalmic Surgeons, will be required to undertake School Ophthalmic Clinics and holiday and casualty cover in the hospitals concerned. Previous experience in ophthalmology is essential. Payment will be at the rate of £175 p.a. per weekly 3¼-hour session.

Applications, stating date of birth, qualifications, and experience, together with the names and addresses of 2 referees, should be sent to the Secretary of the Regional Hospital Board, 27, Tyndalls Park-road, Bristol, 8, not later than 12th March, 1955.

**WEST FIFE HOSPITALS BOARD OF MANAGEMENT.** Applications are invited from suitably qualified medical practitioners, for the post of REGISTRAR (resident) at Glenlomond Hospital, by Kinross (140 Beds—Respiratory and Non-respiratory Tuberculosis). The post is superannuable under the National Health Service superannuation regulations. Salary and conditions of service in accordance with national agreements.

Applications, giving full details of previous experience, should be lodged with the Physician-Superintendent, Glenlomond Hospital, by Kinross.

**WOLVERHAMPTON GROUP.**

**New Cross Hospital, Wolverhampton**

HOUSE OFFICER (general surgery). Pre-registration post. Vacant 28th February.

**Wolverhampton Eye Infirmary** (Recognised for F.R.C.S. and D.O. examinations)

2 HOUSE OFFICERS. 1 vacant 28th February, 1 vacant early April.

Apply Secretary, The Royal Hospital, Wolverhampton.

**WORCESTER ROYAL INFIRMARY. (213 Beds.) Senior** HOUSE OFFICER (surgical) required at the end of March. The post is recognised for F.R.C.S. and is the senior of the resident posts, offering wide experience in surgery.

Applications, with names and addresses of 2 referees, to the Secretary.

**YORK. CITY HOSPITAL. (Modern General Hospital** of 265 Beds with full Consultant staff.) RESIDENT HOUSE SURGEON (pre-registration or registered) required immediately. Recognised for F.R.C.S.

Applications, giving age, qualifications, experience, nationality, and names of 2 referees, to Secretary, York A and Tadcaster Hospital Management Committee, Bootham Park, York.

**YORKSHIRE. EAST RIDING HOSPITAL MANAGEMENT COMMITTEE.**

**Westwood Hospital, Beverley, Yorkshire** (229 Beds)

Pre-registration HOUSE OFFICER in Obstetrics and Gynæcology, vacant now. Hospital has Maternity Unit of 22 Beds and Gynæcological Annexe of 18 Beds. Fully qualified practitioners may apply.

Detailed applications to Group Secretary

**WARWICK HOSPITAL. (350 Beds.) Resident Pædiatric** HOUSE PHYSICIAN (Male or Female), vacant 21st March. 30-Bedded Unit. Post recognised D.C.H. and pre-registration.

Apply Medical Superintendent.

**WINDYGATES, FIFESHIRE. CAMERON I.D. HOSPITAL.** RESIDENT HOUSE PHYSICIAN required for a period of 6 months. The post is recognised for Pre-registration Service. The Hospital consists of 100 infectious diseases beds including 12 for treatment of tuberculous meningitis, and 30 chronic sick beds.

Apply, with copies of 2 recent testimonials, to the Medical Superintendent, East Fife Hospitals Board of Management, 243A, High-street, Kirkcaldy.

**U.S.A. RICHMOND, VIRGINIA. HOSPITAL DIVISION, MEDICAL COLLEGE OF VIRGINIA.** Positions open for ASSISTANT RESIDENT and JUNIOR ASSISTANT RESIDENT training beginning 1st July, 1955. 3-year training programme approved by the American Medical Association and the American Board of Psychiatry and Neurology.

Send applications to Doctor R. FINLEY GAYLE, JR., Professor of Psychiatry, Medical College of Virginia, Richmond 19, Virginia, for details concerning formal training programme and salary.

## Public Appointments

**FACTORY DOCTORS. Factories Acts, 1937 and 1948.** The following appointments as Appointed Factory Doctor are vacant. Apply to Chief Inspector of Factories, 19, St. James's-square, London, S.W.1.

| *District* | *County* | *Latest date for receipt of applications* |
|---|---|---|
| PETERHEAD .. | ABERDEEN .. | 12TH MARCH, 1955 |
| DALKEITH .. | MIDLOTHIAN .. | 12TH MARCH, 1955 |

**IPSWICH. COUNTY BOROUGH OF IPSWICH.** Applications are invited for the appointment of DEPUTY MEDICAL OFFICER OF HEALTH, DEPUTY PRINCIPAL SCHOOL MEDICAL OFFICER AND DEPUTY PORT MEDICAL OFFICER. Applicants must be duly registered medical practitioners possessing the D.P.H. and preference will be given to those who have had previous experience in relation to the School Health and Mental Health Services. Salary scale £1233 6s. 8d. by annual increments of £50 to £1483 6s. 8d., and the commencing salary may be determined having regard to the previous Local Authority service of the successful candidate.

Application forms and conditions of service will be forwarded on application to the Medical Officer of Health, Elm-street, Ipswich. Canvassing will disqualify.

J. C. NELSON, Town Clerk.

Town Hall, Ipswich, 14th February, 1955.

**SURREY COUNTY COUNCIL. Merton and Morden URBAN DISTRICT COUNCIL.** Applications invited from fully qualified registered medical practitioners for the mixed appointment of COUNTY DIVISIONAL AND URBAN DISTRICT MEDICAL OFFICER OF HEALTH. Salary £1652 p.a., rising by annual increments to £2006 p.a. Commencing salary according to experience. Appointment subject to medical examination and to Local Government superannuation acts.

Applications, stating age, qualifications and experience, with names of 3 referees, to County Clerk, County Hall, Kingston upon Thames, by 19th March.

W. W. RUFF, Clerk of Surrey County Council.

HARRY MAY, Clerk of Merton and Morden Urban District Council.

**HER MAJESTY'S OVERSEA CIVIL SERVICE. Medical BRANCH—UGANDA.** MEDICAL OFFICERS required for general medical duties and to assist with training subordinate African medical staff. Appointment can be made (subject to 2 years probation) on a permanent basis with pension (non-contributory) at the age of 45–55, or on short-term contract with gratuity. Salary scale ranges from £1116 to £1836 a year, plus a temporary (non-pensionable) cost-of-living allowance of 10% of salary subject to a maximum of £162 a year. Commencing salary is determined according to qualifications and experience. Pension is earned at the rate of 1/600th of final pensionable emoluments for each completed month of service. The gratuity (taxable) in respect of contract service is 13⅓% of total salary drawn, not including allowances. Candidates in the National Health Service may resign from the National Health Service but retain their superannuation rights up to 6 years and receive a gratuity (taxable) of 20% of the aggregate of their salary after the end of their engagements. Permanent Medical Officers are eligible to be considered at any time for promotion to super-scale posts in Uganda and other territories in medical administration or, if they possess appropriate qualifications and suitable experience, in specialist posts. Quarters are provided at rental between £21 and £60 a year; items of hard furniture supplied at rental of £12–£24 a year. Free passages provided in both directions; for Officers serving tour of 30–36 months, 4 tourist class air-passages provided for Officer, wife and dependent children or sea passages (1st class) up to cost of 3 adult fares; for Officers serving short-tours of 12–18 months, tourist passages provided for Officer, wife, and all dependent children. Educational subsidies are payable to Officers, which vary from £90 a year (or half the school fees, whichever is less), for the primary education for the first child, to £190 a year (or three-fifths of school fees, whichever is less) for secondary education for each of second and subsequent children. Education facilities are available in East Africa, though many parents send their children home to United Kingdom for secondary education. Income-tax at local rates. Local leave is permissible and generous home leave is granted after each tour. Candidates must possess medical qualifications registrable in the U.K.

Application forms from Director of Recruitment, Colonial Office, Sanctuary Buildings, Great Smith-street, London, S.W.1 (quoting reference No. BCD. 117/9/02).

**HER MAJESTY'S OVERSEA CIVIL SERVICE. Research** BRANCH. EAST AFRICA TSETSE AND TRYPANOSOMIASIS RESEARCH AND RECLAMATION ORGANISATION. An opportunity is offered for a Medical Man to carry out research on sleeping sickness (trypanosomiasis) and its epidemiology in Tanganyika (near Shinyanga), East Africa. There will be scope for both clinical and laboratory work. Total initial emoluments are in the scale £1150–£1870 a year, according to experience and qualifications; that is salary £840–£1520 a year plus cost-of-living allowance which is at present at the rate of 35% of salary. (These rates are under revision and will be increased.) Outfit allowance of £60 is also payable on first appointment. Quarters are provided at low rental and accommodation for officer and family is available. Free passages for officer, wife, and children under the age of 13. Superannuation is provided under the Colonial superannuation scheme. Candidates must possess a medical degree or diploma registrable in the United Kingdom and preferably have postgraduate experience in epidemiology and/or pathology.

Further information may be obtained from Dr. F. HAWKING, National Institute for Medical Research, The Ridgeway, Mill Hill, London, N.W.7, and application forms from the Director of Recruitment, Colonial Office, Sanctuary Buildings, Great Smith-street, London, S.W.1 (quoting reference No. BCD. 195/198/02).

**HER MAJESTY'S OVERSEA CIVIL SERVICE. Medical** BRANCH—MAURITIUS. MEDICAL OFFICER OF HEALTH required in the Medical Department in Mauritius to deal with all matters affecting the health of the district assigned to him, coördinating the activities of the Social and Health Services, directing the work of all sanitary staff in the district and assisting in the training of local health staff. Candidates must have medical qualifications registrable by the General Medical Council in the United Kingdom, and possess the Diploma in Public Health. Appointment can be made on a permanent basis with pension (non-contributory) at the age of 55, or on contract (with gratuity) for 3 years. Salary scale is Rs. 11,700–Rs. 19,020 (£877 10s.–£1426 10s.) a year. In addition a temporary non-pensionable cost-of-living allowance is payable which amounts to 11% on salary not exceeding Rs. 12,000 (£900) a year and 8% on salary over Rs. 12,000 £900 p.a. Gratuity is payable after satisfactory completion of contract and is assessed at the rate of £37 10s. for each completed period of 3 months while salary is below £1000 a year and £50 for each similar period when salary is over £1000 a year. Government of Mauritius would pay employer's share of pension contributions (if applicable). Quarters are not provided but officers who have not been allocated Government houses will be reimbursed any difference between approved rent paid for a private house (subject to a maximum of Rs. 250 (£18 15s.) a month) and the 10% salary they would normally pay for a Government house. For this purpose, officers residing in hotels or boarding houses will be regarded as paying half the board and lodging charge for themselves and their wives in respect of rent. Income-tax at local rates. Free passages in both directions are provided for officer, wife, and children not exceeding 5 persons in all. Generous home leave is granted after each tour of 3 or 4 years.

Application forms from the Director of Recruitment, Colonial Office, Sanctuary Buildings, Great Smith-street, London, S.W.1 (quoting reference No. BCD.117/52/02).

**GOVERNMENT OF BAHAMAS. Assistant Medical** OFFICER required to work in the Bahamas General Hospital and to perform any other duties as required by the Chief Medical Officer. Appointment will be on agreement for 3 years in the first instance at a salary of £1150 a year. There is at present no income-tax. Quarters are not provided but rent assistance amounting to the difference between 15% of salary and the actual rent payable on a house up to a maximum rental of £600 a year will be given. Passages provided for officer, wife, and up to 2 children on appointment, and on completion of period of engagement. Assistance up to £40 is given towards cost of transporting heavy baggage. Climate is excellent and healthy for Europeans. Social and recreational amenities are good. 12 weeks leave on full salary is granted on completion of engagement. Candidates should hold qualifications registrable in the United Kingdom.

Application forms from Director of Recruitment, Colonial Office, Sanctuary Buildings, Great Smith-street, London, S.W.1 (quoting reference No. BCD.117/27/02).

**LONDON COUNTY COUNCIL. Applications are invited** from registered medical practitioners for appointment as Whole-time MEDICAL OFFICER in the Public Health Department. Inclusive salary £950 a year rising by annual increments of £50 to £1300 a year. Commencing salary dependent on local government service. No emoluments. Duties are primarily connected with child health. It will be an advantage if the candidate is experienced in maternity and child welfare work and the School Health Service and has the Diploma in Public Health.

Application forms from the Medical Officer of Health (PH/DI), The County Hall, London, S.E.1, and should be returned by 14th March. (207.)

**WEST BROMWICH. COUNTY BOROUGH OF WEST** BROMWICH. Applications invited from registered medical practitioners for the post of SENIOR ASSISTANT MEDICAL OFFICER OF HEALTH AND SCHOOL MEDICAL OFFICER. Possession of D.P.H. and/or previous experience in a Public Health Department essential. Duties mainly clinical but include certain amount of administration, and officer appointed will act for the Medical Officer of Health in his absence. Salary within the scale £950–£50–£1400 p.a. according to experience and qualifications. Post subject to medical examination, and 2 months notice on either side.

Applications, giving names of 3 referees, to the undersigned by 19th March, 1955.

Town Hall, West Bromwich. J. M. DAY, Town Clerk.

## Hospital Services : Non-Medical Appointments

**BIRMINGHAM ACCIDENT HOSPITAL, Bath-row,** BIRMINGHAM, 15. SENIOR TECHNICIAN or TECHNICIAN (according to qualifications and experience) in Histology Laboratory, Pathology Department. Considerable histological experience essential and general experience in hospital laboratory technique desirable. Whitley Council terms. Further particulars from Consultant Pathologist.

Applications, naming 2 professional referees, to Administrator.

## Miscellaneous

*To non-professional posts the Notification of Vacancies Order 1952 applies.*

**A medical journal requires an Assistant Editor with** special interest in the problems of general practice. Previous editorial or journalistic experience will strengthen application. Appointment is full-time. Minimum salary £1200–£1500 according to experience; exceptional candidate might be considered part-time, remuneration adjusted accordingly.—Apply: Address, No. 106, THE LANCET Office, 7, Adam-street, Adelphi, London, W.C.2.

**Assistant Works Medical Officer, Imperial Chemical** Industries Limited, Wilton Works, near Redcar, in Cleveland, Yorkshire, requires the services of an additional Medical Officer. He will be responsible to the Senior Medical Officer who, with part-time clinical assistance and nursing and administrative staff, provides the medical service for the factory employing up to 7000 personnel. Candidates with experience of industrial medicine or casualty work are preferred but Services or general practice experience or an Industrial or Public Health Diploma would be an advantage. It is a permanent appointment carrying a salary commensurate with experience and qualifications. —Application forms may be obtained from the Staff Officer, Imperial Chemical Industries Limited, Wilton Works, Middlesbrough, Yorkshire, quoting advertisement reference ICI/X/216/a.

**Plastic Surgeon wanted, well qualified and trained, who** would be interested in immigrating to the United States and taking out citizenship papers. To be associated with a large mid-western plastic surgery Clinic. Guaranteed minimum of $10,000 per year net. For right person, $25,000 net income with 2–3 years is assured. Must spend 6 months in Rotating Internship to fulfil requirements for State Laws. Private practice devoted entirely to plastic surgery—growing rapidly. Senior partner retiring. Write all particulars, including references and type and extent of general surgical training and when you would be available.—Address, No. 105, THE LANCET Office, 7, Adam-street, Adelphi, London, W.C.2.

**Doctor for Korea. Immediate appointment, initial con**tract 2 years, return fare paid. Salary—depending on experience —approximately £1000 p.a., plus board and accommodation. Qualifications :—

(1) Sufficient clinical experience especially among children.

(2) Experience of modern methods in the diagnosis and treatment of tuberculosis.

(3) Interest in diseases found in Korea though rare in England, e.g., leprosy, typhus, typhoid and helminth infections.

(4) A sense of vocation, which will keep the welfare of the children before all other considerations.

N.B. Only those who have (1) and (4) in good measure should apply.

Applications to be sent to the Foreign Relief Secretary, The Save the Children Fund, 20, Gordon-square, London, W.C.1 (Telephone : EUSton 8591. 9.30 A.M.–5.30 P.M.).

**Doctor, 3 years experience in medical photography, seeks** post as photographer in any branch of medicine, preferably research.—Address, No. 108, THE LANCET Office, 7, Adam-street, Adelphi, London, W.C.2.

**Doctor, at present engaged part time preparing literature,** &c., for small pharmaceutical company, seeks other similar part-time work or full-time appointment.—Address, No. 101, THE LANCET Office, 7, Adam-street, Adelphi, London, W.C.2.

**Ideal for Nursing-home. Premises close Sloane-square,** well-appointed for purpose and first-class order throughout. Direct Cadogan lease of 31 years at low ground rent. Price £8000 or close offer.—Full particulars from GIBSONS, 18, Cedarhurst-drive, S.E.9.

**"Pregnancy Diagnosis by the Xenopus Method," 24-hour** service. Send specimen of urine and £1 1s. fee. Hematology, Biochemistry, Flame Photometry.—WELBECK BIOLOGICAL LABORATORIES, 26, Park-crescent, Portland-place, W.1 (MUSeum 5386–7).

**Applicants for posts requiring testimonials copied or** duplicated should communicate with MANTON SECRETARIAL SERVICE, LTD., 98, Victoria-street, S.W.1 (Phone : VICtoria 0141), who are specialists in this kind of work.

**Professional, technical and personal typewriting. Dupli**cating, circularising, &c., efficiently and speedily executed.—"MOWBRAY," 146, Bishopsgate, E.C.2 (BIS. 2545, BAR. 7665).

**Hypnotism. Will all Doctors interested in this subject** for Medical purposes please write to the Secretary, British Society of Medical Hypnotists, 126, Harley-street, W.1.

**Hanovia Duo-Therapy Unit, Model IX in perfect order** to sell.—PADdington 2967.

**Austin. The New Show Models A.30, A.40, A.50 and A.90.** Limited number of deliveries to proven essential users.—Application form, brochures, easy terms from Austin House, 140–144, Golders Green-road, Golders Green, London, N.W.11.

**A car for your needs—we can supply new: Standards** 8 and 10; Zephyr Convertible; T.R.2; Riley 1½ litre; Morgan Coupe and others.—BASIL ROY LTD., 161, Gt. Portland-street, W.1 (LANgham 7733).

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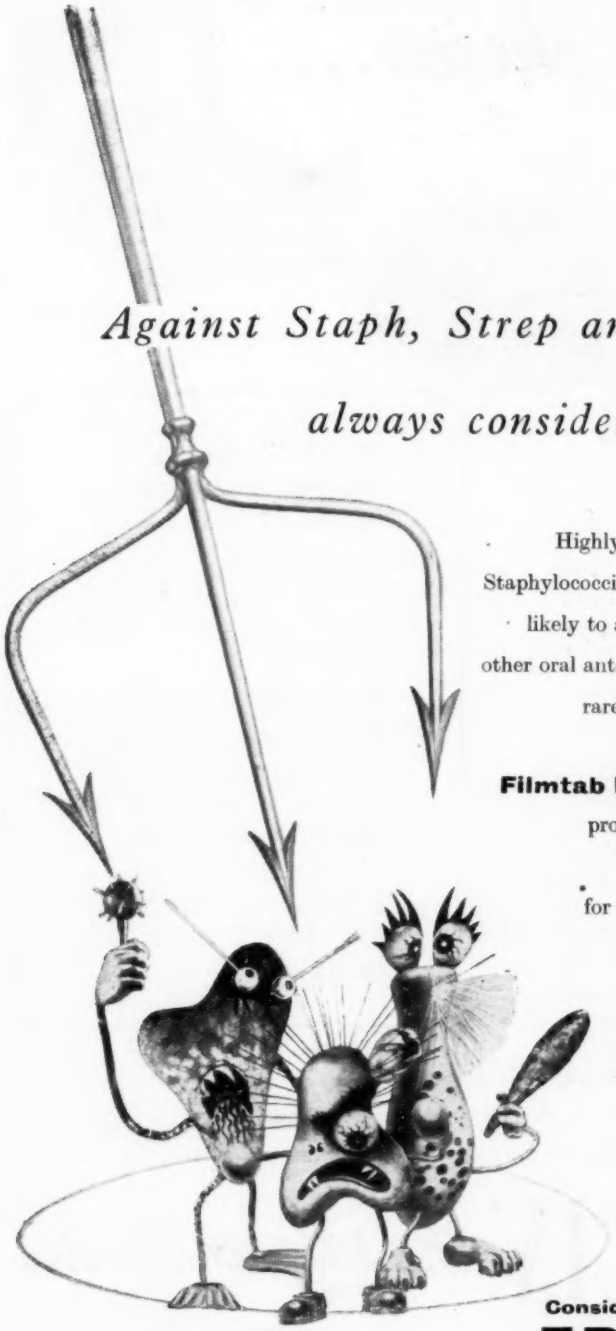

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*always consider* **ERYTHROCIN**
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Highly-active Erythrocin is effective against Staphylococci, Streptococci and Pneumococci. Less likely to alter normal intestinal flora than most other oral antibiotics. Gastrointestinal disturbances rare, with no serious side effects reported.

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provides high blood concentration within 2 hours with significant concentration for 8 hours. Average adult dose, 200 mg. every four to six hours. Available in bottles of 25 and 100 Filmtabs 100 mg. and 200 mg. For children Erythrocin Stearate Oral Suspension (100 mg. per 5 cc.) in bottles of 60 cc. (2 fl. oz.).

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(Erythromycin Stearate, Abbott) Regd.
**STEARATE**

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iii

# The right choice....

Bassanio's choice of the leaden casket was a nice blend of luck and judgment; but there need be no doubt in the mind of the physician who wishes to select the most potent antibiotic against staphylococci, streptococci and pneumococci.

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Flavoured oral suspension for children in bottles to make 60 cc. (5 cc.=100 mg. 'Ilotycin').
*Average Dose:*
½ teaspoonful per stone bodyweight every six hours.

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